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U.S. DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration

FEDERAL COORDINATOR FOR METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH

NATIONAL SEVERE LOCAL STORMS OPERATIONS PLAN

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February 1971

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
FEDERAL COORDINATOR FOR METEOROLOGICAL
SERVICES AND SUPPORTING RESEARCH

NATIONAL SEVERE LOCAL STORMS OPERATIONS PLAN

Supersedes National Severe Local Storms
Operations Plan - 1970

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NATIONAL SEVERE LOCAL STORMS

OPERATIONS PLAN

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P R E F A C E

In a memorandum dated March 6, 1967, the Federal Coordinator for Meteorological Services and Supporting Research requested the Interdepartmental Committee for Meteorological Services (ICMS) to produce an annual National Severe Local Storms Operations Plan. This Plan and the ones which have preceded it were developed to meet this request. The Plan outlines the responsibilities of the various U.S. agencies which provide meteorological services in observing and forecasting severe local storms. Facilities of the Departments of Commerce, Defense, and Transportation are integrated into a joint effort to reduce the damage and minimize the casualties resulting from these storms.

This National Severe Local Storms Operations Plan supersedes the 1970 version. It is issued in looseleaf form so that future revisions can be made by page changes. The total Plan will be reissued every 5 years.

Robert M. White
Federal Coordinator for Meteorological
Services and Supporting Research

CHAPTER 1

RESPONSIBILITIES OF COOPERATING AGENCIES

1. The National Weather Service. It shall provide:

a. Basic surface, upper air, and radar observations from its network of stations making such observations.

b. Additional observations, when required, making all such reports available to any requesting agency on the appropriate teletypewriter communication circuits. Where feasible, standardized message headings and endings will be used when transmitting regular or special observations on teletypewriter circuits, especially the Radar Report and Warning Coordination (RAWARC) circuit.

c. Basic analyses and forecast charts through the National Meteorological Center (NMC), Suitland, Md.

d. Special Severe Weather Watch Bulletins, radar facsimile charts, and hourly radar summaries to the general public, aviation, and all concerned interests through the Severe Local Storms (SELS) Unit and the Radar Analysis and Development Unit (RADU) of the National Severe Storms Forecast Center (NSSFC) at Kansas City, Mo.

e. Statements and local warnings through Weather Service Forecast Offices (WSFO) and local Weather Service Offices (WSO) throughout the United States.

f. In-flight advisories through the Flight Advisory Weather Service (FAWS) units for periods up to 4 hours for aircraft (civilian and military) and amendments to appropriate aviation forecasts whenever a severe local storm or storms are expected or are in existence.

g. A concerted effort to collect and relay Pilot Reports (PIREPS).

2. The National Environmental Satellite Service (NESS). It shall:

a. Operate satellite systems capable of providing coverage of selected portions of the United States during the severe weather storms season.

b. Receive and respond to requirements for coverage of specific areas and times from the NSSFC at Kansas City.

c. Provide data in the form of pictures for selected stations to authorized research facilities.

d. Be available for conferences with personnel of the NSSFC and other WSFOs, either in person or by telephone.

3. Air Weather Service. The Air Weather Service is responsible for weather warning support to U.S. Air Force (USAF) and U.S. Army units throughout the world. Through the Air Force Global Weather Central (AFGWC), Offutt AFB, Neb., it shall provide:

a. Weather warning support in the conterminous United States and 200 miles offshore to:

(1) USAF and U.S. Army installations.

(2) Air National Guard and Air Force Reserve Units.

(3) Plant sites and facilities operated under Department of Defense (DOD) contracts.

(4) Airborne military aircraft when under military control.

b. The use of the USAF communications system to disseminate:

(1) Military weather advisories for general areas in graphic form, four times daily, at 0000Z plus every 6 hours, covering 12 hours.

(2) Point weather warnings in plain language, as required, whenever weather is expected to meet warning criteria. These point weather warnings are issued to approximately 500 military locations in the conterminous United States.

(3) Severe weather summaries of occurrences of severe convective activity.

(4) Further weather outlooks in plain language, twice daily, for the 6-hour period beyond the 0000Z and 1200Z advisories.

(5) A continuous meteorological watch on the possibilities of severe weather developments and of other weather phenomena for which the AFGWC has warning responsibility.

c. Basic surface, upper air, and radar observations from its network of stations making such observations.

d. Additional observations, when required, making all such reports available to any requesting agency on the appropriate teletypewriter communication circuits.

e. A concerted effort to collect and relay PIREPS.

4. The U.S. Navy. It shall provide for:

One full-time Synoptic Weather Radar Reporting Network station at the Naval Air Station (NAS) Pensacola, Fla.

The Navy does not operate a centralized Severe Local Storms Warning Service. Requirements for early warnings of hazardous flying conditions and local destructive phenomena are met by the NSSFC/AFGWC products interpreted locally by Naval Weather Service personnel. Full use is made of information displayed on the National Facsimile Network (NAFAX), military, and civil weather circuits.

5. The Federal Aviation Administration (FAA). It shall provide:

a. Communication services in support of the Severe Local Storms Operations Program (Service A, Area B Service, Service C).

b. The PIREPS for use in Severe Local Storms Operation Program.

c. The Flight Service Station (FSS) and tower surface observations.

d. Distribution of Airmen's Meteorological Information (AIRMETS) and Significant Meteorological Information (SIGMETS) by the FSS.

6. Exchange of Data Between Agencies.

a. There shall be a mutual exchange of relevant data on the part of all concerned agencies outlined in chapter 1. Because the NSSFC and AFGWC are the units responsible for preparing severe weather forecasts, data concerning such forecasts will be exchanged between these units. Direct telephone communications between the AFGWC and NSSFC may be made by Automatic Voice Network (AUTOVON) through the operators at Richards-Gebaur AFB, Mo.

b. The coordination channel for exchange of data between the NSSFC and AFGWC shall be between the Commander, AFGWC, and the Director, NSSFC. Unresolved differences will be referred to the Emergency Warnings Branch, Weather Analysis and Prediction (WXAP) Division, National Weather Service Headquarters, and Headquarters, Air Weather Service.

c. At the present time, only the National Weather Service and the Air Weather Service are actively engaged in developing objective severe weather forecasting techniques. These agencies will engage, whenever possible, in a joint technique development program and will exchange any objective techniques developed by either agency.

7. Requests for Special Observations.

Any special rawinsonde or pilot balloon (PIBAL) observations needed during the continuous weather watches underway at NSSFC and at AFGWC are authorized and will be requested when needed.

When special upper air network soundings are required, they should normally be made at 1800Z. The Director, NSSFC, will initiate the request to

National Weather Service and National Aeronautics and Space Administration (NASA) stations, and the Commander, AFGWC, will similarly request soundings from DOD stations. Although other WSFOs have the authority to request special upper air observations during periods of potentially severe storms of all types, requests for special soundings during periods of potentially severe local storms should be made by SELS. Any cost involved in these special soundings will be borne by the agency making the sounding.

Air Weather Service requests for National Weather Service or National Aeronautics and Space Administration soundings should be made to the duty forecaster at NSSFC. National Weather Service requests for USAF soundings should be made to the duty forecaster at AFGWC.

CHAPTER 2

DEFINITIONS

One of the aims of this Plan is to list and define those common meteorological terms, subject to multiple interpretations, which are used by agencies preparing severe local storms forecasts and warnings. For the purpose of this Plan and its annexes, the following definitions will be used:

1. Severe Local Storms Season. Although the center of maximum frequency shifts during the year, tornadoes and severe thunderstorms occur somewhere in the United States every month of the year. The months of greatest total frequency are April, May, and June.

2. Funnel Cloud. A violent, rotating column of air which does not touch the ground, and is usually pendant from a cumulonimbus cloud.

3. Instability Line. A line of incipient, active, or dissipating non-frontal instability conditions that is transitory in character, usually developing to maximum intensity within a period of 12 hours or less and then dissipating in about the same length of time.

4. Severe Local Storms. Dangerous storms that usually cover relatively small geographical areas and periods of time, and are of sufficient intensity to threaten life or property. Examples are tornadoes or thunderstorms accompanied by frequent lightning, large hail, and/or damaging winds.

5. Severe Thunderstorm. A severe thunderstorm is defined by wind gusts of 50 knots or greater or by hail at the surface of 3/4-inch diameter or larger.

6. Squall Line. A line of active thunderstorms or squalls which may extend over several hundred miles. It is the phenomenon of the mature or active stage of "instability-line" development, and may be either a solid or broken line of numerous thunderstorms.

7. Tornado. A violent, rotating column of air which forms a pendant, usually from a cumulonimbus cloud, and touches the ground. It nearly always starts as a funnel cloud and is accompanied by a loud roaring noise. On a local scale, it is the most destructive of all atmospheric phenomena.

8. Waterspout. A funnel cloud which forms over a body of water--such as a bay, lake, or gulf--and touches the water.

FORECASTS AND WARNINGS

1. General. Although every effort has been made to standardize terminology, adopt common definitions, and adjust criteria to a common base, each agency has differing operational warning criteria that must be met. Therefore, standardization will be used wherever possible in forecasts and warnings, but each agency retains the right to specify the forecast and warning criteria which are needed to carry out the mission of its service. The common criteria and differences will be discussed in the following sections.

2. Severe Local Storms. To qualify as a severe local storm, at least one of the following conditions must be present:

a. Tornado.

b. Funnel cloud.

c. Severe thunderstorms with either or both:

(1) Surface winds with gusts equal to or greater than 50 knots.

(2) Hail of 3/4 inch or greater in diameter, at the surface.

d. Waterspout.

3. Other Warning Criteria. All other phenomena described in the various warnings, bulletins, and advisories should be categorized as "other warning criteria," and are not called severe weather phenomena. Such other warning criteria will be listed separately in appropriate National Oceanic and Atmospheric Administration (NOAA)/National Weather Service and USAF/Air Weather Service publications.

4. Thunderstorm Intensity Categories. Only the following thunderstorm intensity classes will be used in the forecasting and warning functions of the agencies listed in chapter 1.

a. Thunderstorm. Wind gusts of less than 50 knots and hail, if any, of less than 3/4 inch in diameter.

b. Severe thunderstorm. Wind gusts of 50 knots or greater or hail of 3/4 inch or greater in diameter at the surface.

5. Thunderstorm Density Categories. The following adjectives will be used to describe the expected density of severe thunderstorms along an instability line or in an area:

a. Isolated--an extremely small number are expected.

b. Few--up to 15 percent coverage.

c. Scattered--16 to 45 percent coverage.

d. Numerous--more than 45 percent coverage.

Adjectives such as the above will not be used to indicate the expected density of tornadoes. The Tornado Watch Bulletin will simply state that the threat of tornadoes exists in the designated watch area.

6. National Weather Service Warning Procedures.

a. General. Although the National Weather Service has statutory responsibility for providing a Severe Local Storms Warning Service for all 50 States, the extremely low frequency of severe local storms in Alaska and Hawaii does not justify establishment of a similar Service for these States.

This Warning Service is for use by the general public and by general and commercial aviation and is provided through the National Severe Storms Forecast Center (NSSFC) at Kansas City, the National Meteorological Center (NMC) at Suitland, Flight Advisory Weather Service (FAWS) units; the Weather Service Forecast Offices (WSFO) and the local Weather Service Offices (WSO).

b. The National Meteorological Center (NMC). The NMC is the central data processing center responsible for the issuance of prognostic charts, discussions, and other material which may be helpful in calling the attention of the NSSFC and the WSFOs to situations which require issuance of watches.

c. The National Severe Storms Forecast Center (NSSFC). The NSSFC through its SELS unit, has the responsibility for issuing and canceling severe local storm watches and preparing other appropriate material essential to the Severe Local Storms Warning Service.

(1) Criteria for Severe Weather Watch Bulletins. The criteria for Aviation and Public Severe Weather Watch Bulletins are the same. Any or all of the categories listed below must be equaled or exceeded and may be mentioned in the following issuances to indicate more fully the severe weather expected.

(2) Wind and Hail Criteria for Severe Weather Watch Bulletins.

a. Severe thunderstorm. One or more of the following must be present:

(1) Damaging wind--sustained or gusty surface winds of 50 knots or greater.

(2) Hail--at the surface, of 3/4 inch in diameter or larger.

b. Tornado.

(1) Severe weather watches that mention expected tornadoes, also imply that usually severe thunderstorm activity is also expected.

Funnel clouds are not forecast in either an Aviation Severe Weather Watch Bulletin or a Public Severe Weather Watch Bulletin.

(2) Distances from reference points in public forecasts will be expressed in statute miles.

(3) Distances from reference points in aviation forecasts will be expressed in nautical miles.

(3) Watches During Hurricane Threats. Public tornado watches are not issued for areas for which the National Hurricane Center (NHC) or a Hurricane Warning Office (HWO) is issuing Advisories or Bulletins. Such information is contained in appropriate Hurricane/Tropical Storm Advisories or Bulletins. An Aviation Severe Weather Watch Bulletin is issued in such cases.

(4) Functions of the Radar Analysis and Development Unit (RADU). An important adjunct of NSSFC is the RADU. The Radar Facsimile Chart and the Hourly Radar Summaries (SD-1) transmitted on the National Weather Facsimile Network (NAFAX) and Service A circuits, respectively, are prepared by this Unit. Although RADU prepares a Radar Summary Chart hourly, only those charts required by the NAFAX schedule are transmitted on NAFAX.

The alphanumeric SD-1 is prepared after the Radar Summary Chart. Echoes are grouped in predetermined geographical areas (fig. 3-1), and the reference points will be those shown in figure 3-2. Every hour, insofar as practicable, RADU utilizes all available radar data. In the event that it is necessary to omit some reports, the areas of minimum significance will be omitted and this fact indicated in the Radar Facsimile Chart and/or SD-1 Summary.

The military service's weather radars in the intermountain area are acceptable substitutes for S-band radar and can furnish data, routinely and as requested, for the radar summary charts. However, the National Weather Service prefers to use the radar composite (page 31) prepared by its radar unit at the Salt Lake City, Utah, Air Traffic Control Center (ARTCC), as the western portion of these charts, in order to avoid duplication. In addition, more radar data are available from the ARTCC radars due to their location on mountain peaks and the method of tracing the data from the individual radarscopes. As additional military or National Weather Service radars are added to the Synoptic Weather Radar Reporting Network, data from these radars will be used as required by RADU and by the National Weather Service radar unit at the Salt Lake City ARTCC site.

(5) Severe Weather Releases.

a. Watch Bulletins. Severe Thunderstorm and Tornado Watch Bulletins will be prepared and released as required to the press, radio, and television by SELS. Similar watches expressed in terms appropriate to aviation interests are also distributed. These Bulletins alert the public to possibilities of tornadoes or severe thunderstorms including a designation of the areas where their probability is high during a specified time period.

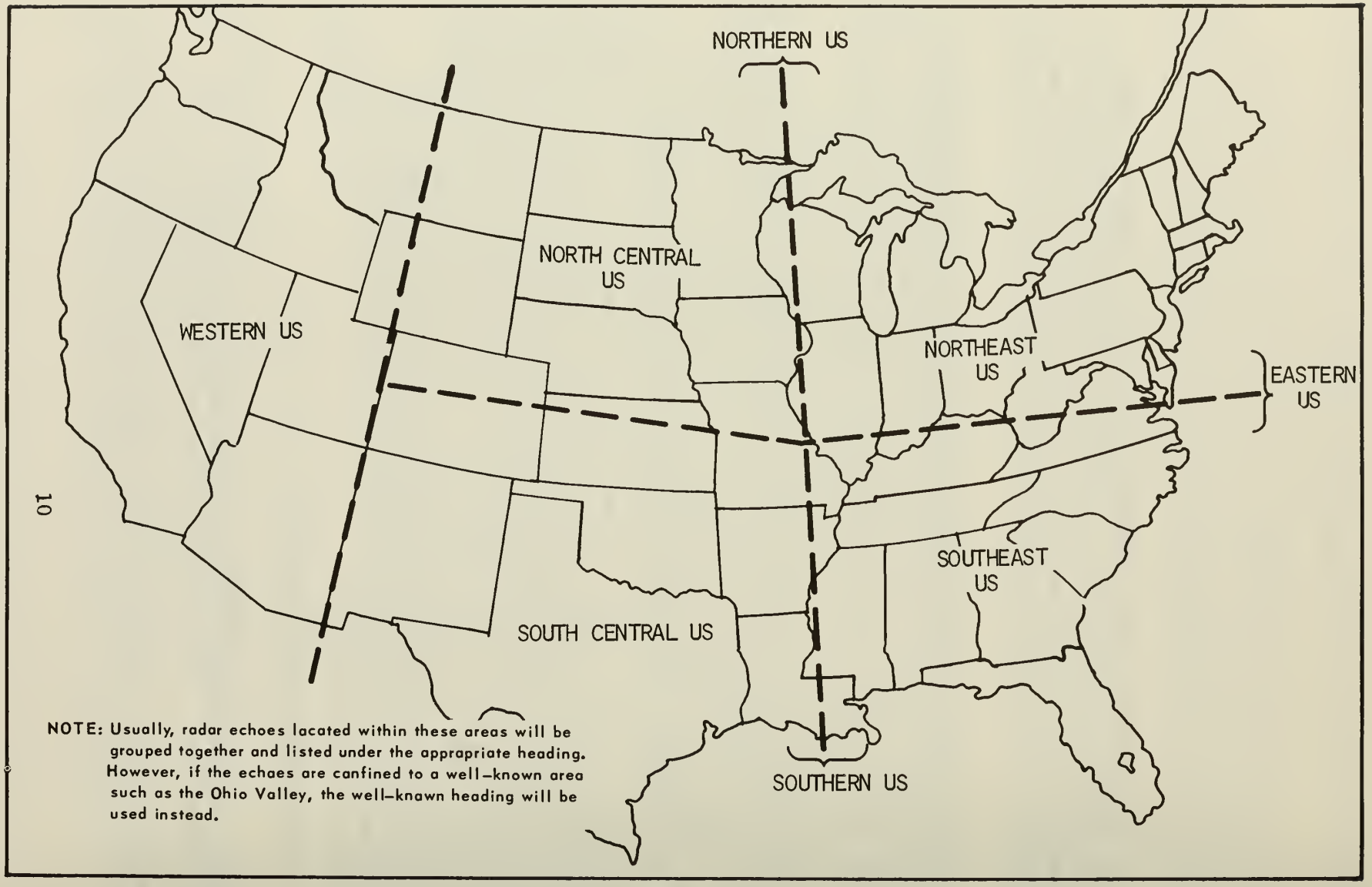

NORTHERN US
NORTH CENTRAL US
WESTERN US
NORTHEAST US
EASTERN US
SOUTHEAST US
SOUTH CENTRAL US
SOUTHERN US
NOTE: Usually, radar echoes located within these areas will be grouped together and listed under the appropriate heading. However, if the echoes are confined to a well-known area such as the Ohio Valley, the well-known heading will be used instead.

Figure 3-1.

GEOGRAPHICAL AREAS USED IN SD-1 HOURLY RADAR SUMMARIES.

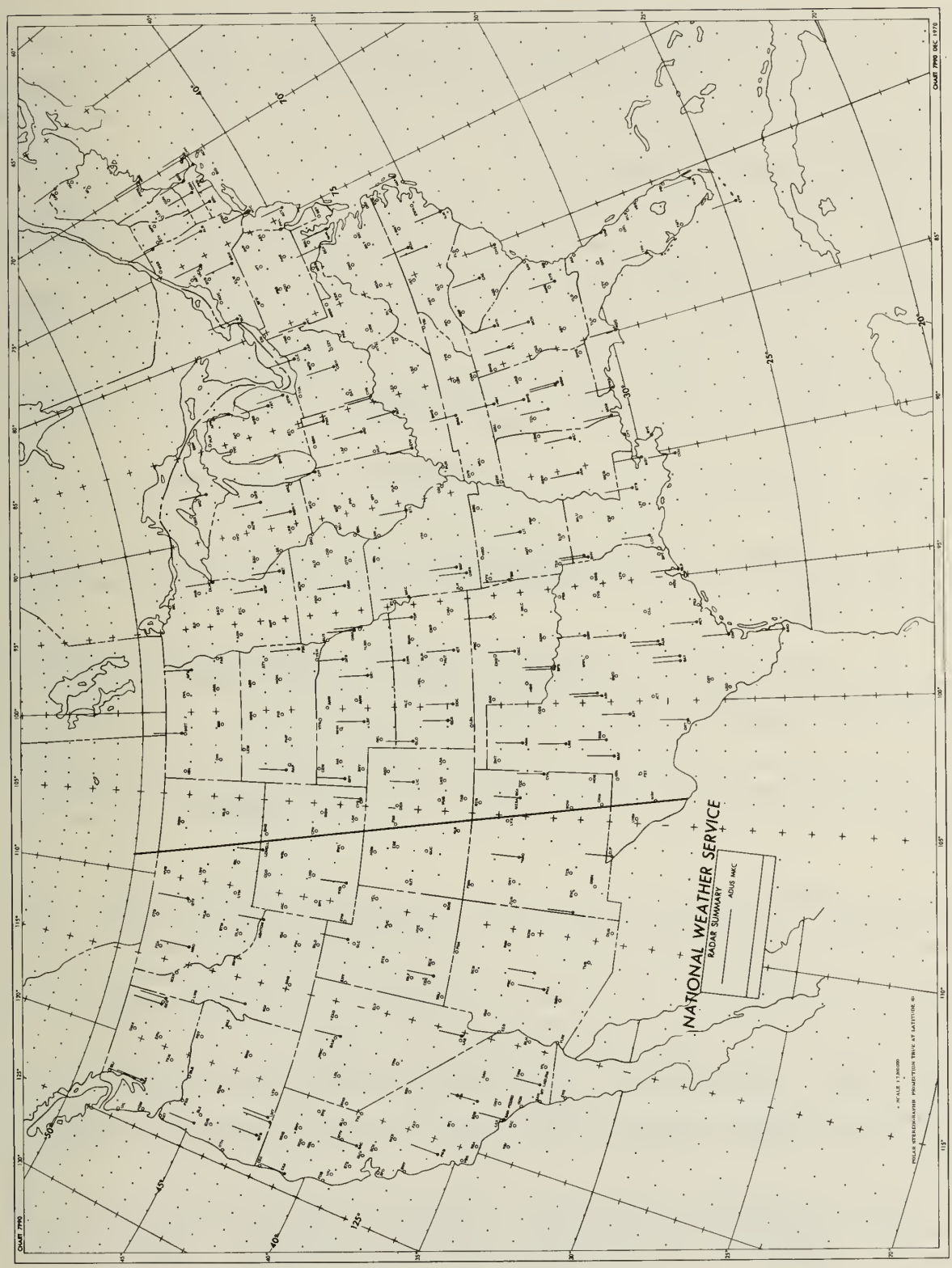


Figure 3-2.
STANDARD REFERENCE POINTS FOR SD-1 SUMMARIES

b. Other SELS Guidance Material. Guidance material such as the Severe Weather Outlook Narrative, Severe Weather Outlook Graphic, Status Reports and All-Clear Information on Weather Watches (WW), Advance Information on Watch Area, and Watch Cancellation Bulletins will be released as appropriate.

d. Weather Service Offices.

(1) Public Severe Weather Watch Bulletins will be distributed immediately to the public in accordance with the County Responsibility Plan of each WSO whenever a threat to any part of the area of county responsibility is indicated by the Bulletin. To help the public visualize which areas are affected by the watch, the affected areas are restated in terms of counties, geographical areas, or prominent cities in a release called a redefining statement. Publications and distribution of various types of material have made the public aware of the National Weather Service's Severe Local Storms Warning Service and its terminology.

(2) Warning responsibility for the general public is vested in local WSOs.

(3) The WSOs are authorized to issue clearing bulletins for all or parts of their areas of county responsibility whenever the threat of severe weather has ended.

(4) Severe weather statements are issued, as appropriate, to provide information on developing severe weather, lack of such development, or severe weather which has occurred or is in existence.

(5) Statements concerning severe local storms which are expected to develop during a period covered by severe weather watches will be included, as appropriate, in regularly scheduled and revised local, State, and zone forecasts.

(6) Severe weather warnings will be issued immediately by the appropriate WSO whenever reports of actual or suspected severe weather in or near an Office's area of responsibility indicate an imminent threat. Each warning will be identified as a Severe Thunderstorm Warning Bulletin or Tornado Warning Bulletin. Full advantage is taken of radar observations in issuing Tornado and Severe Thunderstorm Bulletins. When radar evidence is sufficient in the judgment of the responsible official to identify a dangerous storm, warnings based on these data are issued immediately.

e. Flight Advisory Weather Service Units and Weather Service Forecast Offices.

(1) The Aviation Severe Weather Watch Bulletins will be reflected as Significant Meteorological Information (SIGMETS) and Airmen's Meteorological Information (AIRMETS) as soon as appropriate after issuance. These issuances

are called In-Flight Advisories (FL). However, potentially hazardous flight conditions specified in WWs, which are adequately covered in an aviation area forecast, will not be the subject of an AIRMET issuance.

The FAWS units will advise the ARTCCs of any SIGMETS that they issue which affect the respective ARTCC areas. Appropriate reference is also made to expected severe weather in scheduled and amended aviation forecasts, Pilots Automatic Telephone Weather Answering Service (PATWAS), and Transcribed Weather Broadcast (TWEB) scripts.

(2) Criteria for the issuance of SIGMETS associated with severe local storms include:

a. Tornadoes.

b. Lines of thunderstorms.

c. Embedded thunderstorms.

d. Hail of 3/4 inch or greater in diameter.

e. Severe or extreme turbulence.

f. Severe icing.

7. U.S. Air Force (USAF) Warning Procedures.

a. General. The Air Force Global Weather Central (AFGWC) provides, by means of the USAF communications system, warnings for:

(1) Tornadoes.

(2) Thunderstorms.

(3) Strong surface winds.

(4) Heavy rain or snow.

(5) Freezing precipitation.

b. Military Weather Advisories. The AFGWC issues Graphic Military Weather Advisories in teletype format (figs. 3-3 and 3-4) four times daily at 0000Z, plus every 6 hours. Similar advisories are issued in facsimile format on circuit AFX109. Each Advisory gives the areas where any of the weather elements listed above are expected to occur in the following 12-hour period. An Advisory is an estimate of the weather-producing potential of the existing synoptic pattern and airmasses, based on the assumption that subsequent changes in these features occur as forecast.

KGWC
WWXX WWXX WWXX KGWC 061200Z
MILITARY WEATHER WARNING ADVISORY NR 23 VALID 061800Z to 070600Z

GRAPHIC BULLETIN

X...RED AND BLACK...TORNADOES AND/OR DAMAGING WINDSTORM-ISOLATED...THUNDER-STORMS SCATTERED-FEW SEVERE WITH 1 1/2 INCH HAIL AND WSW TO NW GUSTS TO 65 KNOTS...MAX THUNDERSTORMS TOPS 500...LOCALLY HEAVY RAIN SHOWERS... 2000Z-0400Z...SURFACE WINDS SSE TO SSW 20 KNOTS GUSTS TO 40 KNOTS...1800Z TO 0000Z...CURRENT ACTIVITY EXTENDING FROM SW OK INTO CENTRAL NB CONTINUING ENE MOVEMENT. SQUALL LINE EXPECTED TO REFORM AFTERNOON FROM SW NB THROUGH WRN KS INTO SW TX MOVING ENE AT 25 TO 30 KNOTS.

O...RED AND BLACK...TORNADOES AND/OR DAMAGING WINDSTORMS-ISOLATED...THUNDER-STORMS SCATTERED-FEW SEVERE WITH 2 INCH HAIL AND WSW GUSTS TO 65 KNOTS... MAX THUNDERSTORMS TOP 520...LOCALLY HEAVY RAIN SHOWERS...1900Z TO 0200Z... SURFACE WINDS SSE TO SSW 20 KNOTS GUSTS TO 35 KNOTS...1800Z TO 0000Z... SEE REMARKS ON PARA X ABOVE.

Z...BLUE AND BLACK...DAMAGING WINDSTORMS-ISOLATED...THUNDERSTORMS SCATTERED-FEW SEVERE WITH 1 TO 1 1/2 INCH HAIL AND WSW TO NW GUSTS TO 65 KNOTS... MAX THUNDERSTORMS TOPS 500...LOCALLY HEAVY RAIN SHOWERS...1900Z TO 0300Z.. SURFACE WINDS SSE TO SSW 20 KNOTS GUSTS TO 35 KNOTS 1800Z TO 0000Z.

A...BLACK...SURFACE WINDS WSW TO NW 20 KNOTS FEW GUSTS TO 35 KNOTS...2000Z TO 0200Z.

S...BLACK...SURFACE WINDS SW TO W 20 KNOTS GUSTS TO 35 KNOTS...1900Z TO 0200Z.

T...ORANGE AND BLACK...THUNDERSTORMS FEW-WITH ISOLATED 1/4 INCH HAIL...MAX THUNDERSTORMS TOPS 300...1800Z TO 0300Z...SURFACE WINDS NW 20 KNOTS FEW GUSTS TO 35 KNOTS...1800Z TO 2300Z.

B...ORANGE AND BLACK...THUNDERSTORMS FEW-WITH ISOLATED 1/4 INCH HAIL...MAX THUNDERSTORMS TOPS 350...1800Z TO 0400Z...SURFACE WINDS SSE TO SSW 20 KNOTS GUSTS TO 40 KNOTS...1800Z TO 0100Z.

G...ORANGE...THUNDERSTORMS ISOLATED...MAX THUNDERSTORMS TOPS 300...2000Z TO 0200Z.

M...ORANGE...THUNDERSTORMS FEW-WITH ISOLATED 1/4 INCH HAIL AND SW GUSTS TO LESS THAN 35 KNOTS...MAX THUNDERSTORMS TOPS 320...1900Z TO 0300Z.

Figure 3-3.

EXAMPLE OF DESCRIPTION PORTION OF A MILITARY WEATHER WARNING ADVISORY.

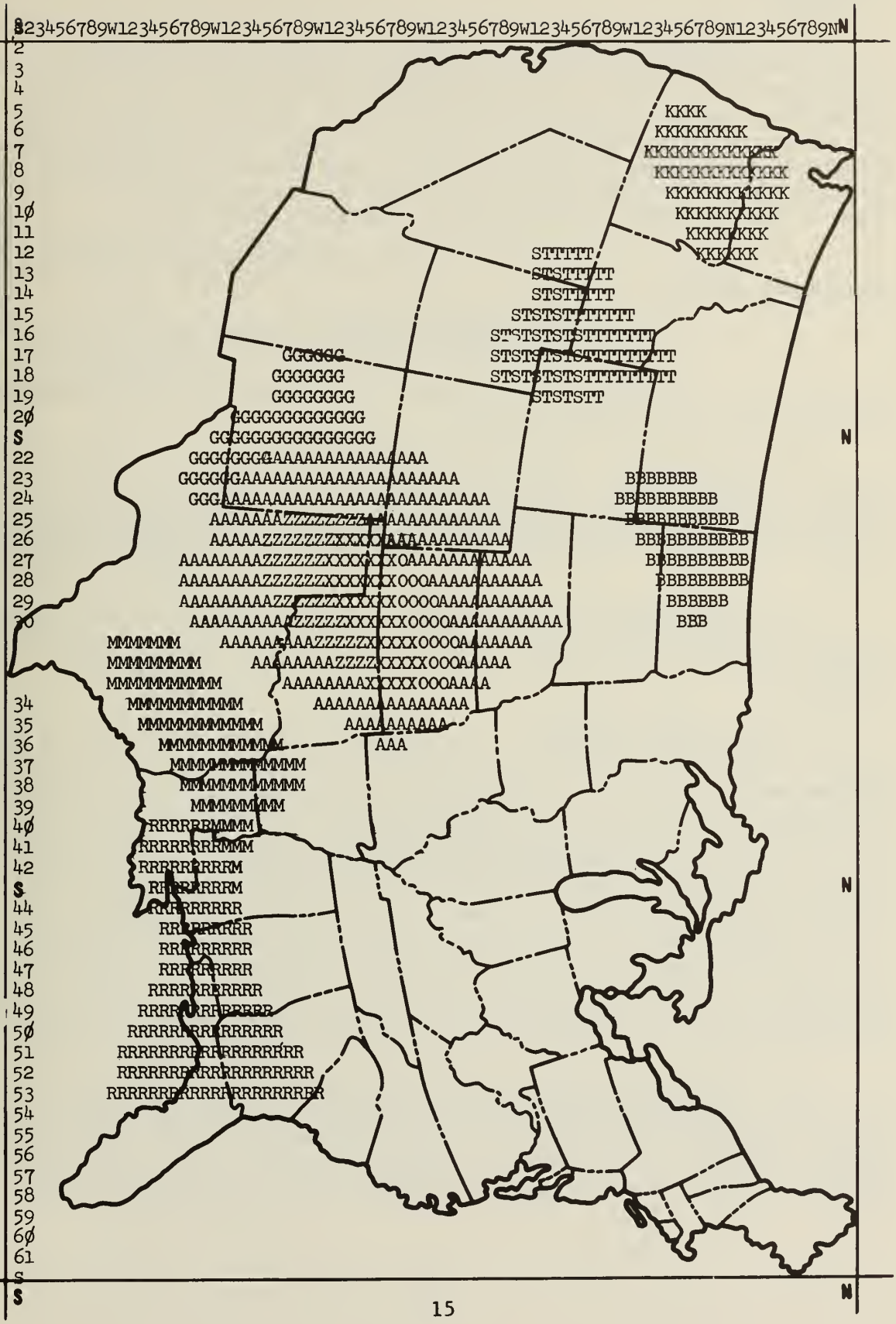


Figure 3-4. Example of Graphic Portion of Military Weather Warning Advisory.

(1) Purpose and Use. The Graphic Advisories are designed to provide basic guidance to both the field forecaster and to the point warning forecasters at the AFGWC. These Advisories are issued at fixed times; preparation time is limited by data availability and presentation format. Advisories may cover fairly large areas as in the case of thunderstorms, snow, and strong gradient winds, but the areas of more severe weather--such as tornadoes and severe thunderstorms--are usually more limited in time and space. Field forecasters should use the Graphic Advisories:

a. To alert themselves and users to potential areas of significant weather.

b. To use as ready-made briefing aids.

c. To indicate the probability of their stations being directly affected during the advisory period.

(2) Amendment. Advisories are amended whenever the elements described change, or are expected to change, by one category or more (for example, nonsevere thunderstorm expected to become severe thunderstorm), and whenever area boundaries change, or are expected to change, by 60 miles or more.

(3) Geographical Interpretation. A clear plastic overlay containing a scaled outline of the conterminous States, placed on the teletypewriter message containing the Graphic Advisory, will provide geographical orientation.

c. Point Weather Warnings. Point Weather Warnings are issued in plain language (fig. 3-5) for the same phenomena as Advisories. While Advisories provide general guidance to all military forecasters in terms of large- and intermediate-scale synoptic developments, Point Warnings are issued for and to specifice locations in the smallest scale of space and time consistent with the availability of data and the state of the art. The locations for which the AFGWC has warning responsibility are listed in Volume II, Air Weather Service Manual 105.2. Some of these locations include two, three, or four installations in one locality; the total number of installations is well over 500. Approximately 50 percent of these locations are Air Force, 45 percent are Army, and 5 percent are Navy. In addition to active military installations, Point Warnings are issued for National Guard units, arsenals, ammunition plants, and other civilian activities under contract to DOD.

(1) Purpose and Use. Point Warnings are issued for specific locations as the situation warrants in contrast to Advisories which are issued at scheduled intervals for fixed valid periods. Point Warnings are amended, extended, or cancelled as necessary. For accuracy, the optimum leadtime is that just long enough to permit necessary protective action.

0 032010Z
WWXX WWXX WWXX 3 KGWC 032010Z
TX 18-19

SEVERE THUNDERSTORMS WITH 1/4 INCH HAIL AND SW GUSTS TO 65 KNOTS VALID 032200Z TO 040200Z TORNADO VICINITY 032200Z TO 040100Z.

OK 7-8

FEW THUNDERSTORMS WITH NO HAIL AND SW GUSTS TO LESS THAN 35 KNOTS EXPECTED IN YOUR GENERAL AREA BETWEEN 031900Z AND 040300Z.

Figure 3-5.

EXAMPLE OF MILITARY POINT WARNING.

Point Weather Warnings:

(a) Provide specific warning to an installation where a forecast unit is not assigned.

(b) Alert a responsible individual at locations with a limited forecast service.

(c) Alert and guide the field forecaster who has final responsibility for warning the agency he supports.

(2) Interpretation.

Area Extent. Point Warnings are issued whenever specific phenomena are expected to occur within a 10-mile radius of a specific installation, with the following exceptions:

(a) A Point Warning for a tornado is issued for a 25-mile radius of the installation. The term "vicinity" is used to identify this increased area.

(b) A Point Warning for severe thunderstorms is issued for a 25-mile radius of the installation. The term "vicinity" is used to identify this area.

(c) A Point Warning for thunderstorms other than severe is issued for a 50-mile radius of the installation. The term "general area" is used to identify this area.

8. Distribution of Watches, Warnings, and Severe Weather Reports by Flight Service Stations.

This Plan does not provide for the distribution of severe weather information by Flight Service Stations (FSS). However, these Stations occasionally receive requests for such information or are given a severe weather report by an observer. Such information or requests will be referred to the WSO having jurisdiction over the county in which the requestor or phenomenon is located. Annex 1 illustrates, by region, the WSOs and their warning responsibility areas; the FSSs should refer the requestor or information to these Offices. The FAA and National Weather Service will develop the communication methods for assuring that these requests and reports reach the appropriate WSO.

COMMUNICATIONS

1. National Weather Service Systems.

a. RAREP (Radar Report) and Warning Coordination (RAWARC). The National Weather Service's internal teletypewriter system is a landline teletypewriter network, consisting of five circuits, which terminates at the NSSFC in Kansas City, the network relay and monitoring office (fig. 4-1). Traffic on RAWARC is basically unscheduled and is handled according to a priority system with severe weather information having the highest priority. The only regularly scheduled material entered on RAWARC is an hourly collection (H+45) of radar reports (SD). Special radar reports and other material can be transmitted at any time the circuits are not in use.

b. Weather Wire Service (WWS). The WWS consists of local loops serving metropolitan areas, statewide intrastate circuits, and overlay circuits. The purpose of the WWS is to transmit consumer-oriented forecasts, watches, weather warnings, and meteorological data to the mass news media for broadcast to the public. Various specialized users also obtain drops on the WWS to meet their requirements.

Each intrastate circuit has one Weather Service Office (WSO) designated as the State Relay Center (SRC). The SRC is also connected to the regional overlay interstate circuit and serves as the relay point for transmissions to other States through their SRCs. In each region, one WSO has been designated as a Regional Relay Center. This Office is responsible for the relay of traffic between overlay circuits.

Only WSOs (or certain other authorized offices) have direct entry on these circuits. The Weather Service Forecast Offices (WSFO) furnish broad-scale information and local WSOs enter local information. Relays between adjacent circuits are established as necessary to meet the requirements of the National Weather Service's Severe Local Storms Warning Service and of subscribers located along State or area borders. When urgent material such as a warning is transmitted, a prearranged bell signal is used to attract the attention of users to the transmission.

Figure 4-2 shows the areas covered, SRCs, regional overlay circuits, and Regional Relay Centers.

c. National Warning System (NAWAS). A Civil Defense-operated telephone hotline connecting Civil Defense Warning Points within each warning area (fig. 4-3) forms the NAWAS network. Usually one or more WSOs within each State has a drop on this System.

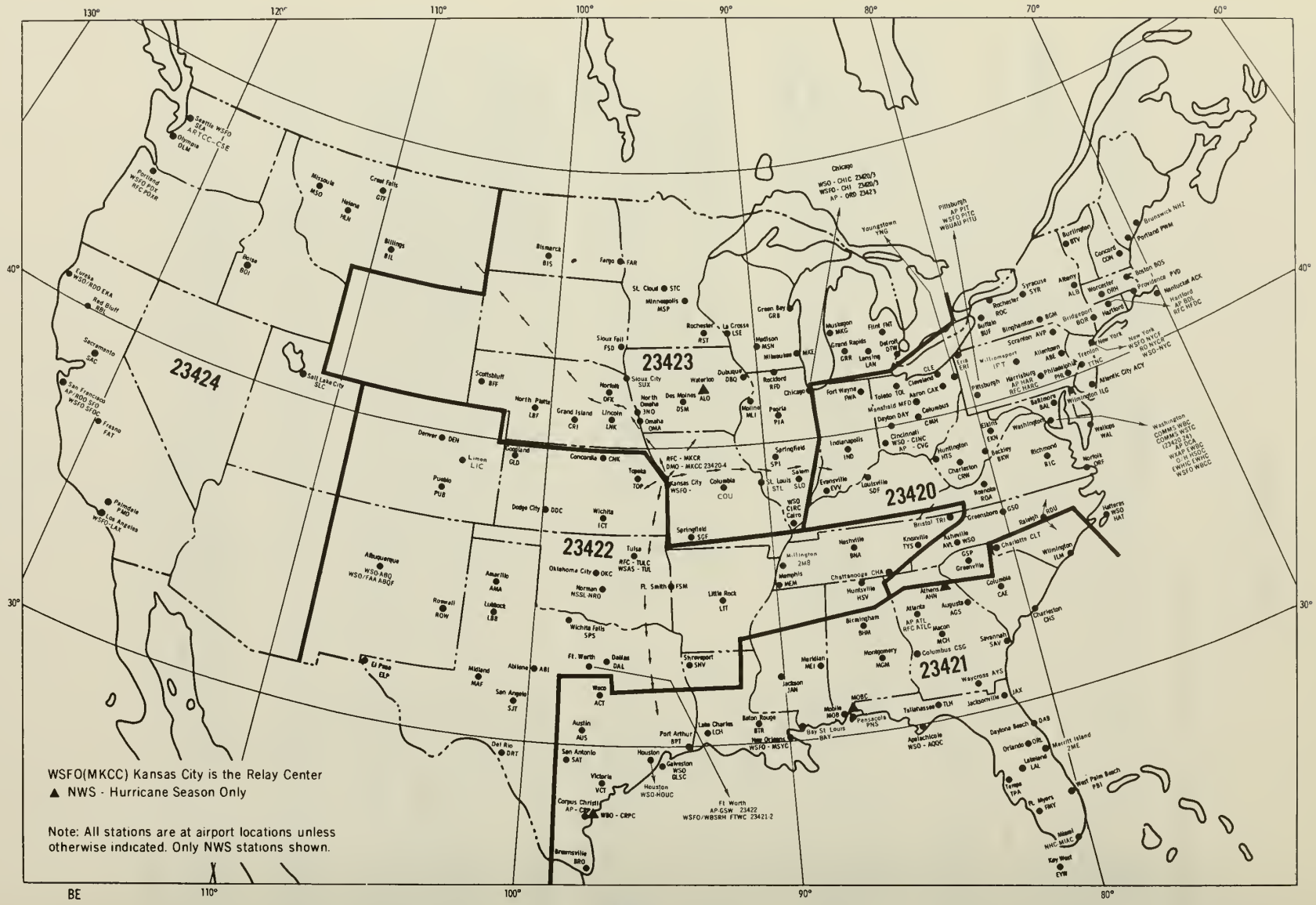

23424
23423
23422
23420
23421
WSFO(MKCC) Kansas City is the Relay Center
▲ NWS - Hurricane Season Only
Note: All stations are at airport locations unless otherwise indicated. Only NWS stations shown.

Figure 4-1.

RAWARC TELETYPEWRITER SYSTEM.

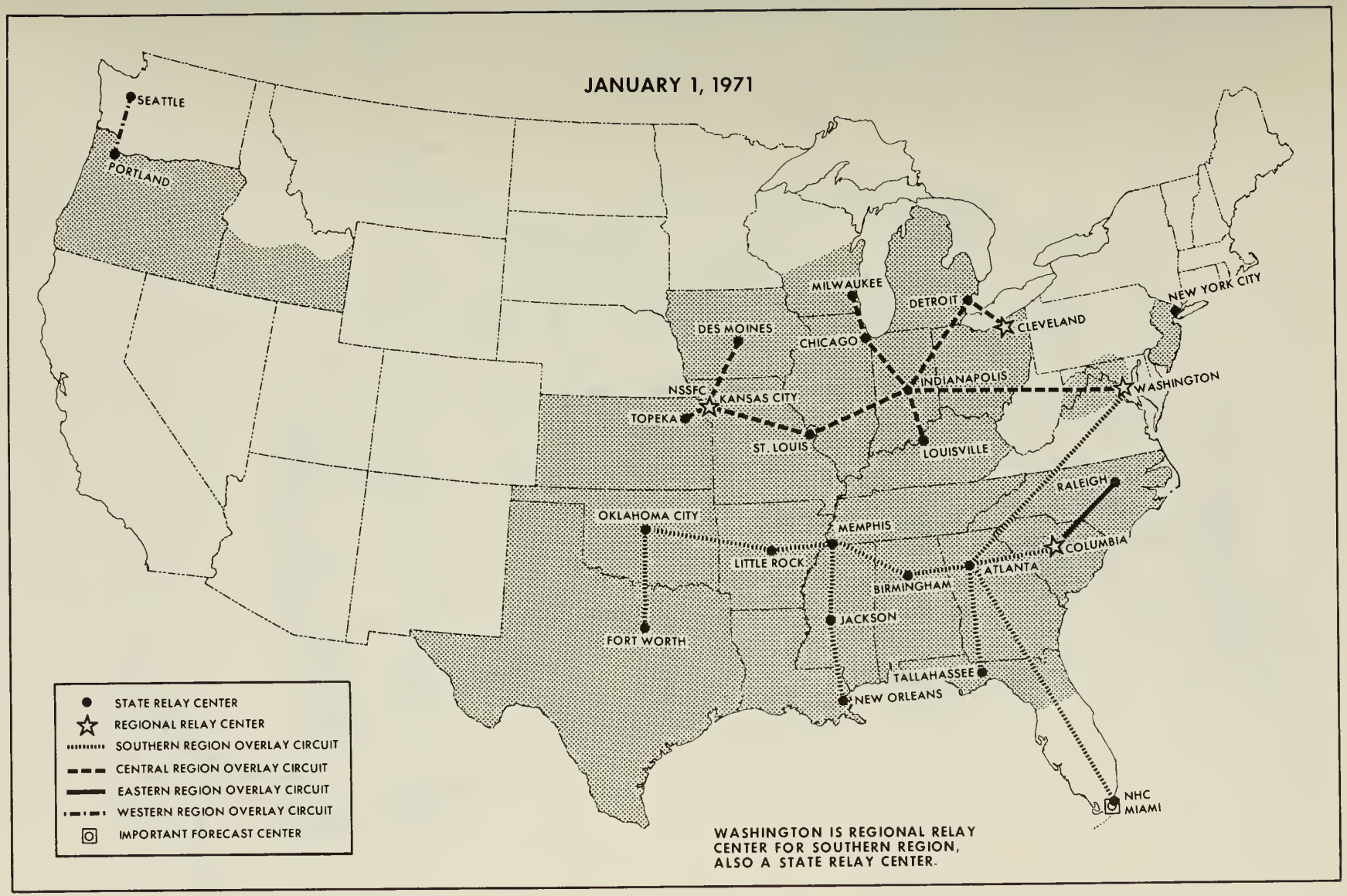


Figure 4-2.

NOAA Weather Wire Service

Figure 4-3.
NATIONAL WARNING SYSTEM.

d. Emergency Action Notification Signal (EANS). When an urgent need arises to inform all concerned of existing dangerous weather conditions, radio and television stations which cover a threatened area are requested to use the EANS. Use of EANS attracts radio and television listeners' attention to a warning and also makes it possible for anyone with a special receiver, or with a special attachment to a conventional radio receiver, to receive the information. The use of EANS for this purpose is at the discretion of the individual radio and television stations.

e. Very High Frequency (VHF) Radio Weather. The WSOs equipped with VHF radio can transmit weather warnings over a frequency of 162.55 MHz or 162.40 MHz (fig. 4-4). These transmitters have a tone alert capability which can be used to activate specially designed muted receivers.

f. Miscellaneous. Other types of distribution methods are used, as appropriate, to make warnings available to other WSOs and to the public as rapidly as possible. In a severe weather situation the WWS is given first priority and others are contacted as time is available. These other methods include:

(1) Telephone (including NAWAS).

(2) Radio and Teleprinter Networks.

(3) Public Service Teleprinter Networks.

(4) Press associations and news services.

(5) Amateur radio.

(6) State Police and Highway Radio and Teleprinter Networks.

(7) State Civil Defense Teleprinter Networks.

(8) Sirens.

g. Distribution of Severe Weather Watch and Warning Bulletins. The communication systems used for distributing Public Severe Weather Watch and Warning Bulletins are shown in figure 4-5.

h. The communication systems used for distribution of Aviation Severe Weather Watch Bulletins and In-Flight Advisories are outlined in figure 4-6.

2. U.S. Air Force (USAF) Systems.

a. Within the conterminous United States, USAF weather radar reports are collected by means of the COMET IIA system and disseminated by the COMET IIB system. Reports collected by means of COMET IIA are transmitted from the Carswell Automated Digital Weather Switch (CADWS) to AFGWC through a computer-to-computer link.

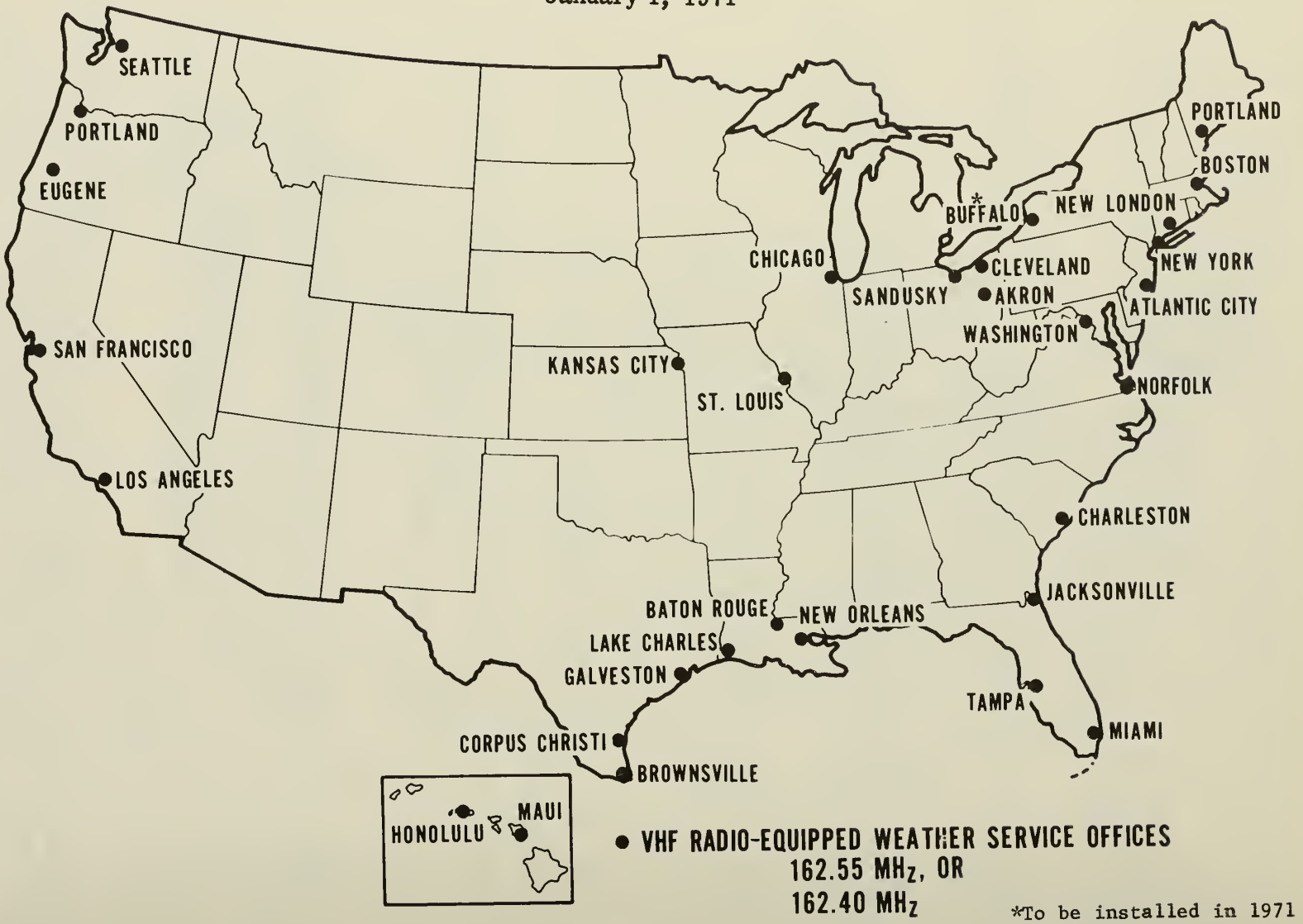


Figure 4-4.

VHF Continuous Transmission System.

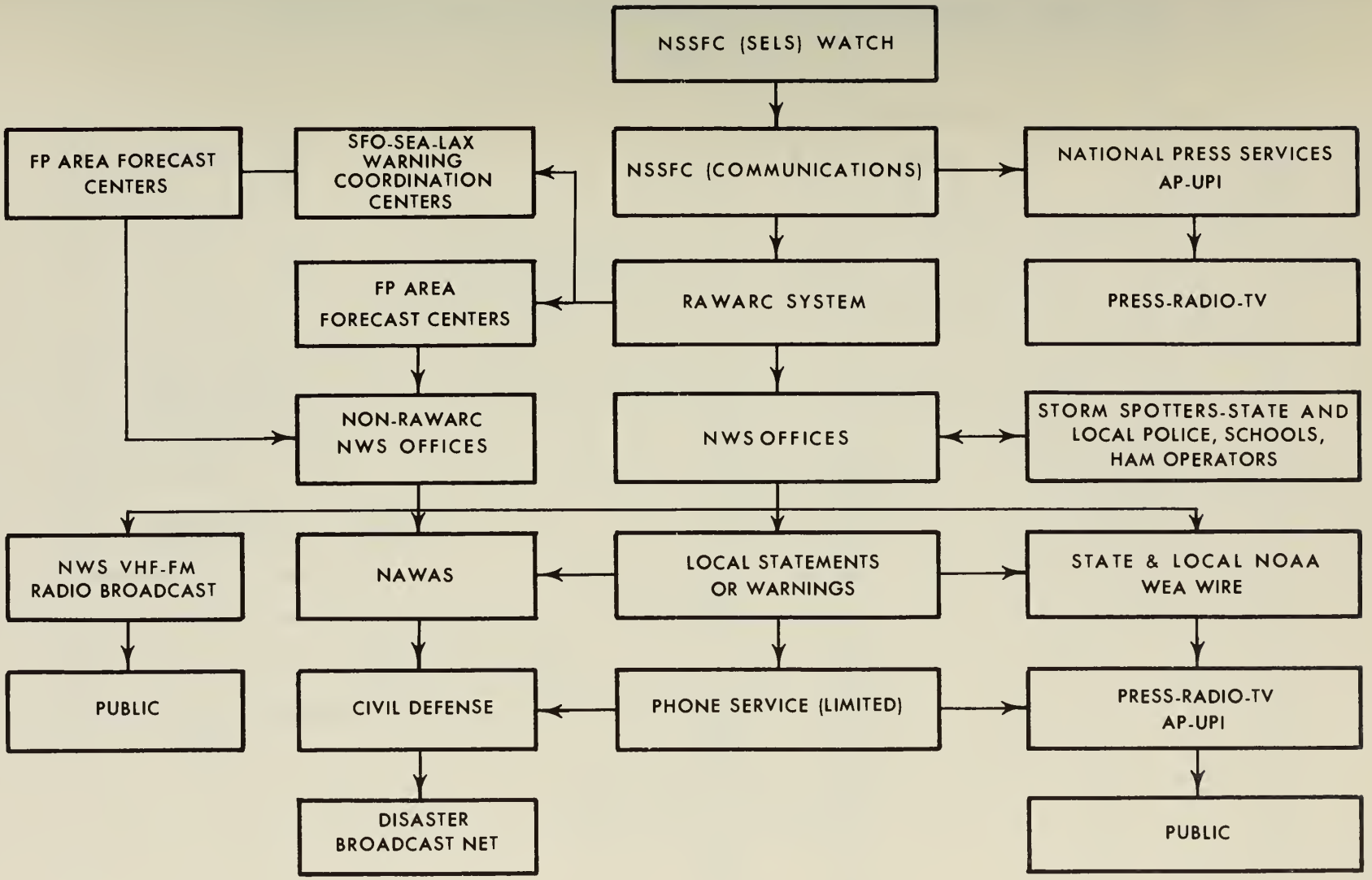


Figure 4-5.

DISTRIBUTION OF PUBLIC SEVERE WEATHER WATCH AND WARNING BULLETINS.

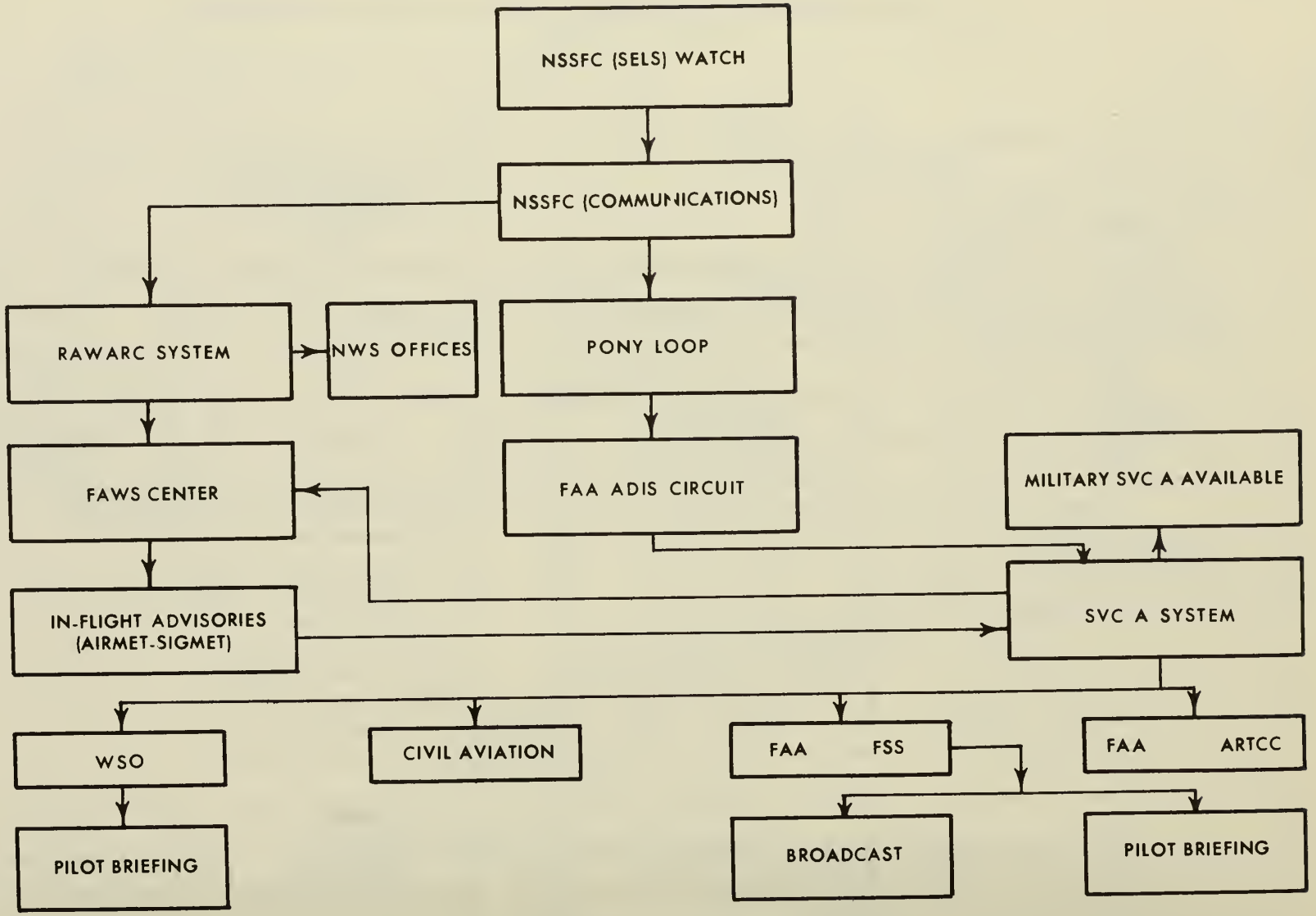


Figure 4-6.

DISTRIBUTION OF AVIATION SEVERE WEATHER WATCH BULLETINS--AIRMET AND SIGMET

b. The COMET II system is divided into eight geographic areas, with a collecting and disseminating circuit covering each area (fig. 4-7).

c. The COMET II system is used to collect and disseminate radar reports.

3. Federal Aviation Administration (FAA) Systems.

a. Service A (fig. 4-8) will be used for the collection and distribution of severe local storms information as follows:

(1) Hourly and Special Airway Observations.

(2) AIRMETS and SIGMETS.

(3) Hourly Radar Summary (SD-1).

b. Area B Service (fig. 4-9) will be used for distribution of PIREPS from FSS to the Flight Advisory Weather Service (FAWS) Offices.

4. U.S. Navy.

U.S. Navy weather reports are collected by means of the USAF's COMET IIA system and disseminated by the COMET IIB system.

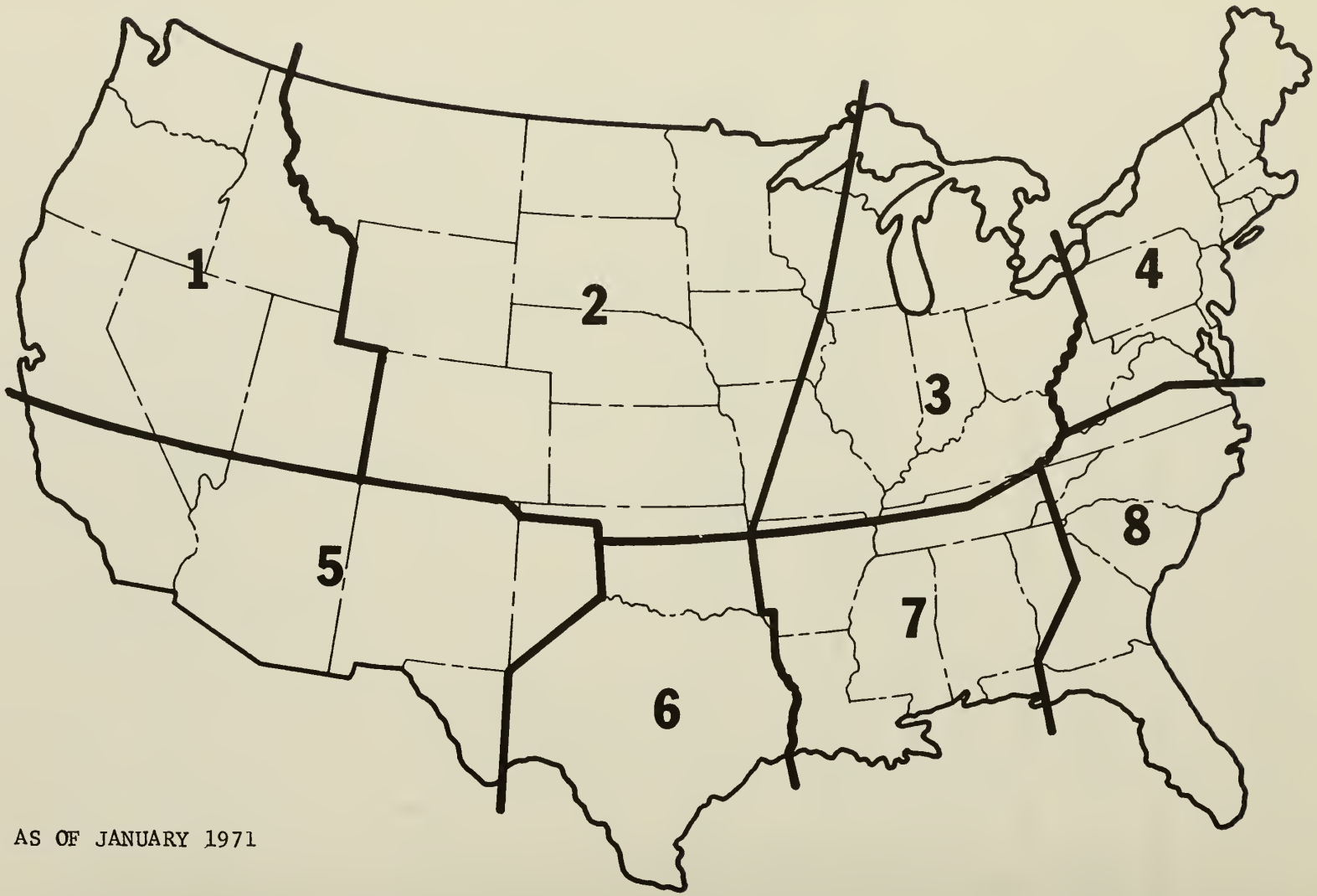


Figure 4-7.

COMET Collecting and Disseminating System

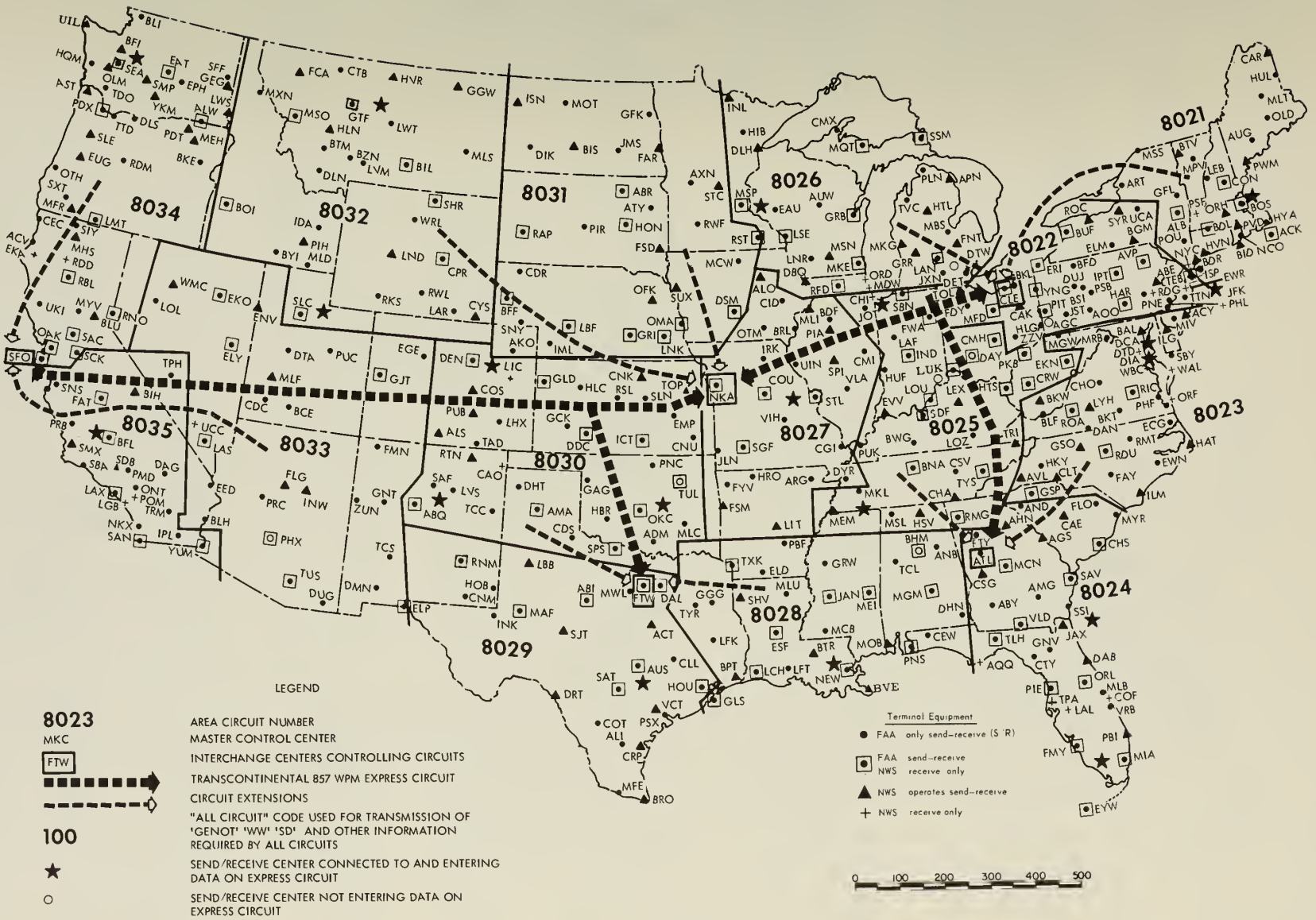


Figure 4-8.

SERVICE A TELET SYSTEM.

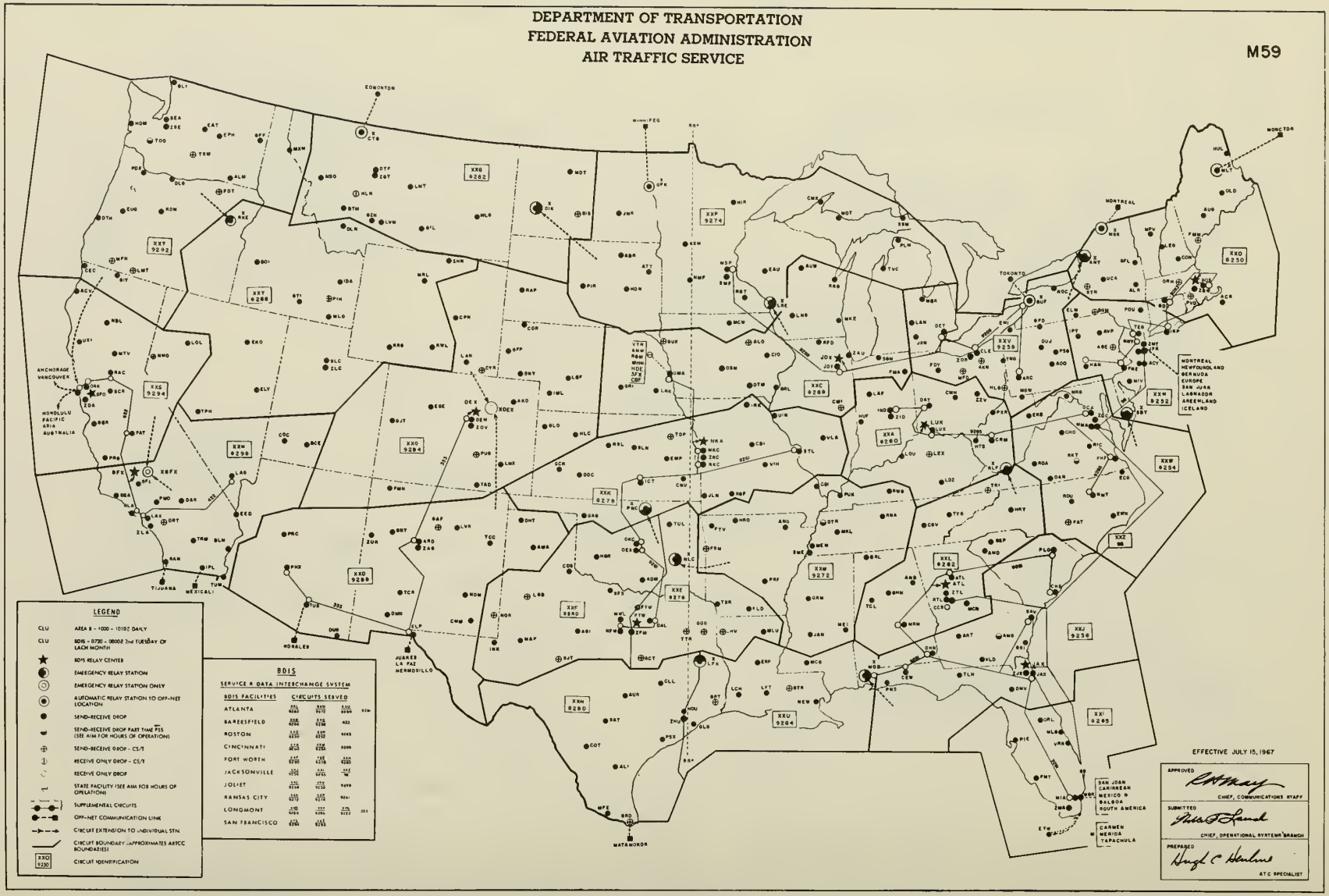


Figure 4-9.

SERVICE B TELETYPEWRITER SYSTEM.

OBSERVATIONS

1. Radar Observing and Reporting Plans.

a. Radar data which are routinely used in the support of this Plan and in the preparation of NSSFC and AFGWC products are available from radars of the Synoptic Weather Radar Reporting Network (fig. 5-1). This Network is composed mainly of National Weather Service WSR-57 radars supplemented by Navy and Air Force weather radars. In the western intermountain region, air traffic control radars remoted into the Salt Lake City, Utah, Palmdale, California, Albuquerque, N. Mex., and Seattle, Wash., ARTCCs are used as substitutes for weather-dedicated radars.

National Weather Service personnel at Palmdale, Albuquerque, and Seattle develop a composite of the radar data from radars remoted into these sites and transmit the data on an interagency facsimile circuit to the National Weather Service's Radar Unit at the Salt Lake City ARTCC. These data are then collated with the Salt Lake City radar data and, by means of data-telephone link, the final composite is sent to the RADU at Kansas City for use in the Radar Summary Chart.

(1) National Weather Service radar observations, other than from these ARTCCs, are transmitted hourly on RAWARC circuit at H+45 in the National Weather Service-Air Force-Navy (WSAN) Radar Report (RAREP) code. More frequent observations are taken in severe weather situations. Data from the ARTCCs are available on the interagency facsimile circuit. Observations are taken at hourly intervals at Salt Lake City and Albuquerque, at hourly intervals at Palmdale between 1245Z and 0445Z, and at hourly intervals at Seattle between 1445Z and 2145Z. When the temperature is below freezing, reporting is limited during the winter at a number of WSR-3 radar stations assigned to the Synoptic Weather Radar Reporting Network because these radars seldom detect snow.

(2) At approximately the same time (H+45), radar reports in the WSAN code from the Air Weather Service (AWS) and Navy radar stations assigned to the Synoptic Weather Radar Reporting Network are forwarded to AFGWC from the CADWS by means of the data link. The NSSFC receives these reports by means of a COMET II drop.

(3) The National Weather Service, Navy, and Air Force have other radars which are not a part of the national networks. These radars are mainly used for local warning purposes, but on occasion they do enter reports on communications circuits.

b. There are a number of Air Defense Command (ADC) radar sites capable of detecting and interpreting weather echoes. Annex 2 lists all such sites, together with their associated AWS Air Division (AD) weather stations. Operational commitments permitting, these sites may provide supplementary reports upon request. However, contacts by a number of different agencies

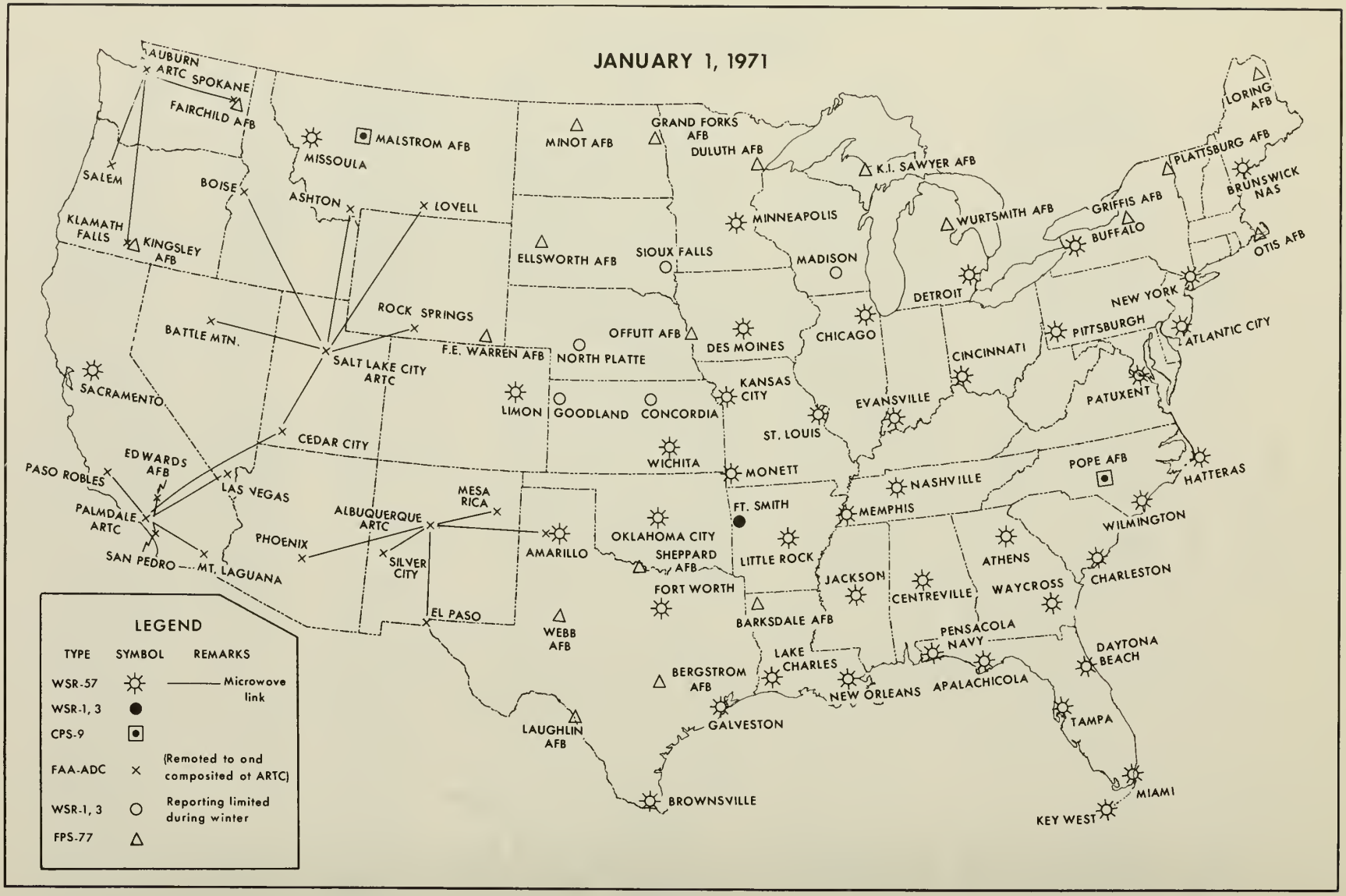


Figure 5-1.

SYNOPTIC WEATHER RADAR REPORTING NETWORK.

to a particular site must be held to a minimum. In general, either the AFGWC or the supervising forecaster of SELS Unit or RADU should attempt to contact a particular site through its associated AD weather station.

c. Whenever radar data from the stations of the Synoptic Weather Radar Reporting Network are missing or appear to be in error, the military agencies and the National Weather Service have authorized the following:

(1) The RADU will telephone the military station and the AFGWC will telephone (if necessary) the National Weather Service Office, for the missing data or clarification. Because the RADU does not have the capability for obtaining such data through the COMET II system, the telephone must be utilized. In most cases where radar data from a National Weather Service Office are missing or in error, the RADU will usually obtain corrected data from that Office by means of RAWARC. Clarification of missing data will usually be available to AFGWC through this means. If such data are not forthcoming after a reasonable wait, the AFGWC should contact the radar unit at the WSO by telephone.

(2) The Air Force and Navy shall provide the NSSFC with telephone numbers of stations in the Synoptic Weather Radar Reporting Network. Telephone numbers of local-use radar stations will also be provided for use in emergency situations. The National Weather Service shall provide the AFGWC with similar telephone numbers for their radar stations.

(3) If Federal Telecommunications System (FTS) or Department of Defense (DOD) telephone lines are not available, commercial telephone shall be used.

d. If a WSO needs radar data from a nearby military radar (Network, ADC, or local use) such data can be obtained by local arrangements between the National Weather Service Meteorologist-in-Charge and the Air Weather Service Detachment Commander or the Commanding Officer of the radar facility. Authorizations for such arrangements have been completed between the National Weather Service and the military agencies in prior agreements. These data will be supplied on a noninterference basis and should usually be limited to severe weather situations.

2. Rawinsonde Observing Stations.

a. Rawinsonde observations are scheduled twice daily, 0000Z and 1200Z, at the 70 stations in the National Weather Service and Military Upper Air Network (figure 5-2). These stations also take special observations when required and requested by the agency concerned. The National Weather Service has mobile upper air stations located at Abilene, Tex., and Huron, S.D. From February 1 to May 31, the Abilene station is in operation; between June 1 and September 30, the Huron station is in operation. When these stations are operating, observations are taken twice daily, at 0000Z and 1200Z.

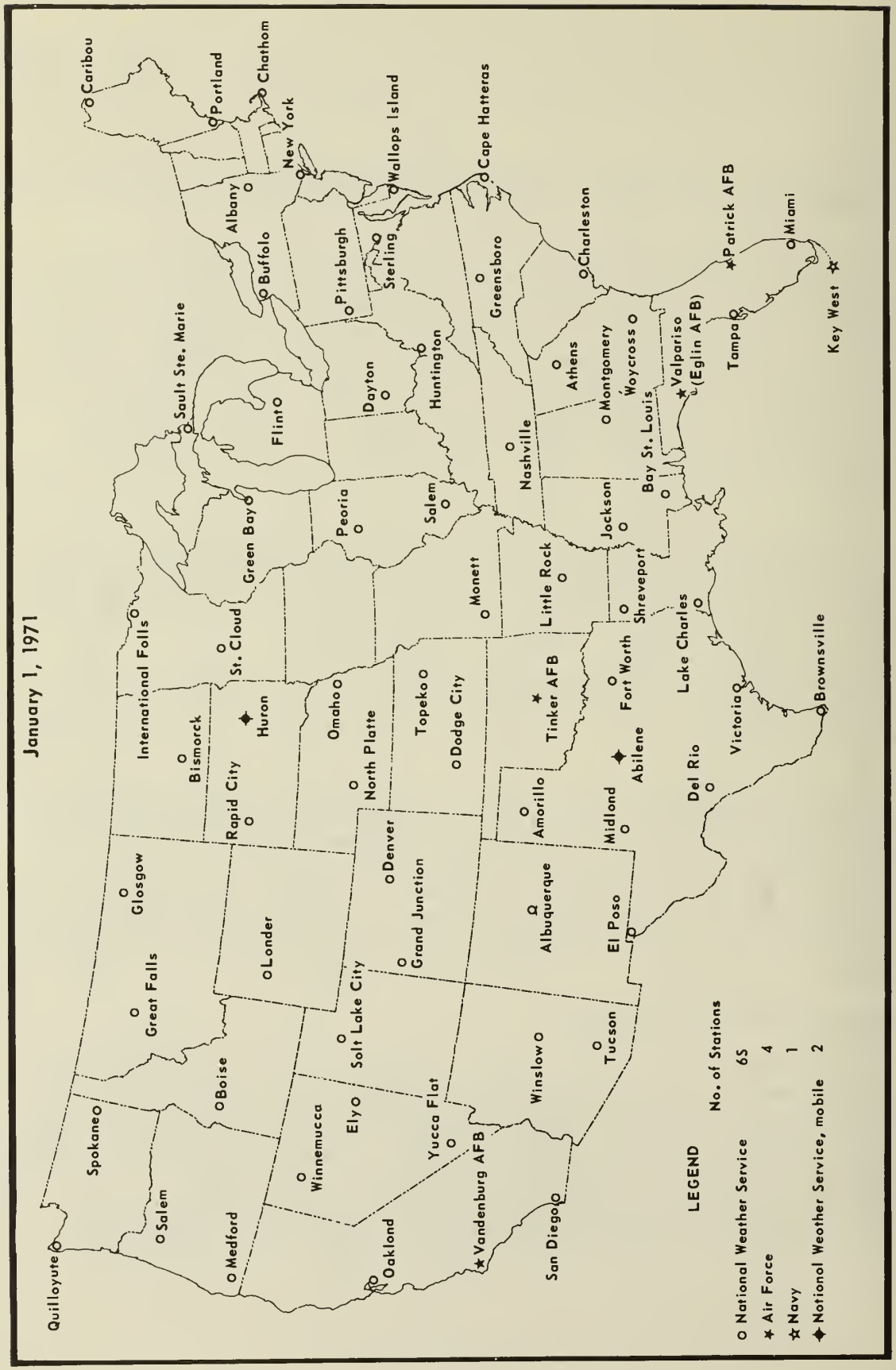


Figure 5-2

NATIONAL WEATHER SERVICE AND MILITARY UPPER AIR NETWORK

Transponder capability is available at 33 stations to permit more accurate measurement of upper winds under strong wind conditions. Evaluated data from the routine soundings are transmitted over the Service C and COMET II teletypewriter systems in the radiosonde code. Data from special soundings requested for potential or existing severe weather situations are transmitted by means of RAWARC and other appropriate communications circuits to the NSSFC and AFGWC. Special soundings transmitted on RAWARC will use the standard upper air message heading to assure their relay to AFGWC.

b. Low-level soundings in support of the air pollution program are taken at the five stations shown in figure 5-3. It is anticipated that the number of such stations will increase during the next several years. These stations take observations to 700 millibars near sunrise and around noon, Monday through Friday. During critical air pollution situations, observations are taken 7 days a week. Data for the sounding taken near sunrise are transmitted on the Service C circuit at 1408Z and relayed, as necessary, to the NSSFC and AFGWC. Data for the noon soundings are transmitted as above on an unscheduled basis.

The DOD takes unscheduled observations at a number of schools, at mobile locations, and at research, development, test, and evaluation facilities. However, because of the irregular scheduling of these observations, the military agencies concerned do not deem it advisable to include all of the observations in this Plan. Nonnetwork upper air stations which might be sources of data are given in table 1.

During the months of April, May, and June when the National Severe Storms Laboratory (NSSL) at Norman, Okla., and other agencies are usually engaged in an intensive severe local storms data collection program in central Oklahoma, upper air soundings are taken at a number of locations in support of this program. Except for the Army unit at Fort Sill, Okla., these data are processed by computer and are not available for real-time use. Data from Fort Sill are transmitted to the NSSFC by means of COMET II. Such soundings are usually terminated at 400 millibars.

3. Surface Weather Observational Network. To provide the basic weather data needed for the analyses performed by the National Meteorological Center (NMC), NSSFC, and AFGWC, all available surface data are used. The following stations provide data:

a. The WSOs and Automatic Meteorological Observing Stations (AMOS).

b. The FAA weather-reporting stations--Flight Service Stations (FSS) and Towers.

c. Supplementary Aviation Weather Reporting Stations (SAWRS), including part-time paid, and cooperative aviation and synoptic weather-reporting stations and the Coast Guard facilities.

Figure 5-3.

URBAN UPPER AIR SOUNDING UNITS.

d. The DOD weather-reporting stations.

These stations take observations and transmit coded observational data at regularly scheduled intervals. Transmissions are made hourly and even more frequently for aviation purposes, every 3 and 6 hours for synoptic map preparation, and daily for climatological purposes.

4. The FAA Aircraft Pilot Reports (PIREPS).

a. The present FAA Instrument Flight Rules (IFR) regulation (91.125, radio communications, section b.) requires pilots to report "(b) Any unforecast weather conditions encountered; and...".

b. The ARTCCs are requested to pass PIREPS to FSSs, which are required to place them on the Area B Teletypewriter Circuit for distribution (see fig. 4-9).

c. The folling significant information should be included in PIREPS whenever it is observed:

(1) Moderate or greater turbulence.

(2) Moderate or greater icing.

(3) Hail encountered.

(4) Location of lines of thunderstorms observed on the airborne radar.

(5) Related maximum observed cloud tops of thunderstorms.

d. The Airline Meteorological Offices receive PIREPS through Aeronautical Radio Inc. (ARINC). All pertinent PIREPS available to Chicago, Ill., or Denver, Colo., on ARINC circuits should be included in the PIREP summaries (UA) for transmission on Service A, and thus are made available to the NSSFC.

5. Severe Storm Surveillance by Meteorological Satellites. Several types of data will be available from the various operating meteorological satellites during the 1971 severe local storms season. A description of the data and information on their availability are given below.

a. Automatic Picture Transmission (APT). Pictures from the APT systems on the ESSA 8, ITOS 1, and NOAA 1 spacecraft will be available at a number of WSFOs, U.S. Air Force stations, and U.S. Navy stations having appropriate ground equipment whenever the satellite is in range of the Office or station or from the National Weather Service's Forecast Office Facsimile Network (FOFAX). At the beginning of the severe local storms season, the time of the pictures for the central United States will be near 0330 and 1530 local

sun time for ITOS 1, 0940 local sun time for ESSA 8, and 0310 and 1510 for NOAA 1. Direct readout is available from the vidicon system and the Scanning Radiometer system. It is important to note that the ITOS 1 and NOAA 1 provide nighttime as well as daytime coverage.

During the day, APT comes from the vidicon system and during the night from the infrared (IR) channel of the Scanning Radiometer. Pictures received directly from the spacecraft may be gridded manually to provide information to the meteorologist almost immediately. Pictures that are gridded by computer are also available on FOFAX from near real-time to about a 30-minute delay on an average. During daylight passes, the imagery from either the visible channel or IR channel of the Scanning Radiometer may be transmitted as well as APT images. However, to receive the IR imagery properly, the recorders will require modification. The direct readout imagery transmitted on FOFAX are acquired at Wallops Island, Va., San Francisco, Calif., and Honolulu, Hawaii. These data will be available to anyone having a suitable recorder by merely obtaining a connection to the FOFAX network.

b. Stored Data Images. Stored data images will be available from ESSA 9, ITOS 1 and NOAA 1. The ESSA 9 has a local node time near 1440 on a northbound track. The ITOS 1 has a local node time near 1530 and NOAA 1 near 1510 on a northbound track for daylight imagery from the Advanced Vidicon Camera System (same as on ESSA 9) or from the Scanning Radiometer. The ITOS 1 and NOAA 1 also have nighttime stored data capability from the IR channel of their Scanning Radiometers during their southbound passes; local node time near 0330 for ITOS 1 and 0310 for NOAA 1. Day and night stored data coverage of the United States from ESSA 9, ITOS 1 and NOAA 1 normally will be available to the National Environmental Satellite Service (NESS) and to the National Meteorological Center (NMC) for interpretation about 1 to 3 1/2 hours after satellite passage. Stored data imagery are computer-processed by the NESS to produce digitized mosaics in map scales and projections that match commonly used weather charts. The mosaics are transmitted on all facsimile circuits.

c. Applications Technology Satellite (ATS). The ATS program is a research and development program of the National Aeronautics and Space Administration (NASA). Two satellites of this series, equipped with meteorological sensors, are in earth-synchronous orbit. The ATS-1 satellite is located over the Central Pacific Ocean near longitude 149°W.; ATS-3 was located near longitude 47°W. until early February 1971, but is being slowly moved to longitude 80°W. In this new position, it is expected to provide suitable data for combined development of local severe storm and hurricane applications in 1971.

The Spin-Scan Cloud Camera systems on ATS-1 and -3 provide monochromatic cloud imagery of the illuminated portion of the earth encompassed by a disc about 5500 miles in diameter centered at the satellite subpoint. Arrangements made with NASA permit the NESS to obtain these cloud images in real-time

at Wallops Island, Va., and to relay them to the NSSFC and the National Hurricane Center (NHC) over special facsimile lines. The installation at these locations includes a high-resolution photographic transparency recorder and a photographic laboratory to process the films and to produce time-lapse photography. During 1971, the imagery will be acquired for 12 to 13 hours on an hourly basis each day from the ATS-1 and -3 combined. Normal schedule for the ATS-3 will call for imagery for about 7 hours, and up to 9 hours during special situations. The type of meteorological problem will dictate the apportionment of time between the two spacecraft.

The Applications and Analysis Groups at the NESS will be available for consultation to interpret difficult situations.

In addition to the special support to NSSFC and NHC, the ATS imagery will also be received and interpreted at NESS to provide the basis for satellite advisories, bulletins, and direct assistance by the NESS staff.

6. Severe Local Storm Actions of Nonmeteorological Agencies and Individuals. The National Weather Service uses observations of severe local storms activity, particularly tornadoes, from many nonmeteorological agencies and personnel such as: utility companies, State Highway Patrols, local police departments, road maintenance patrols, citizen spotters (network), cooperative National Weather Service climatological observers, Citizen Band radio groups, local Civil Defense Organizations, radio and television station mobile units, city employees (for example, the Chicago Sanitary District), FAA, and individual citizens.

Reports are received by various means which are not uniform at each WSO, including Citizen Band or Civil Defense radio facilities (with a transceiver often located in the WSO and manned by local cooperators), police, radio direct telephone lines involving unlisted numbers, the National Warning System (NAWAS), State Highway Patrols, teletypewriter circuits by means of telephone or a sending "drop" on State Weather Wire Service (NWWS) circuits of NOAA, and Service A teletypewriter circuits.

Reports are disseminated to mass news disseminators, other WSOs, and safety agencies by the NWWS circuits (first priority, except for a more expedient means in some local areas), RAWARC, NAWAS, telephone (hotlines and commercial), very high frequency-frequency modulation (VHF-FM) installations of the National Weather Service, direct radio broadcasts, telephone recordings, and Civil Defense radio facilities. The "fan-out" principle is utilized wherever practical.

PUBLICITY

The Military Weather Advisories and Point Weather Warnings of the Air Force Global Weather Central (AFGWC) are designed for specialized military users and shall not be released to the public. News media releases that concern the cooperative efforts in severe storms activities of the DOD and NOAA weather services and other agencies should reflect the joint nature of these efforts by giving due credit to participating agencies. Copies of these releases should be forwarded to:

Deputy Director for Operations/Environmental Services
The Joint Chiefs of Staff
Washington, D. C. 20301

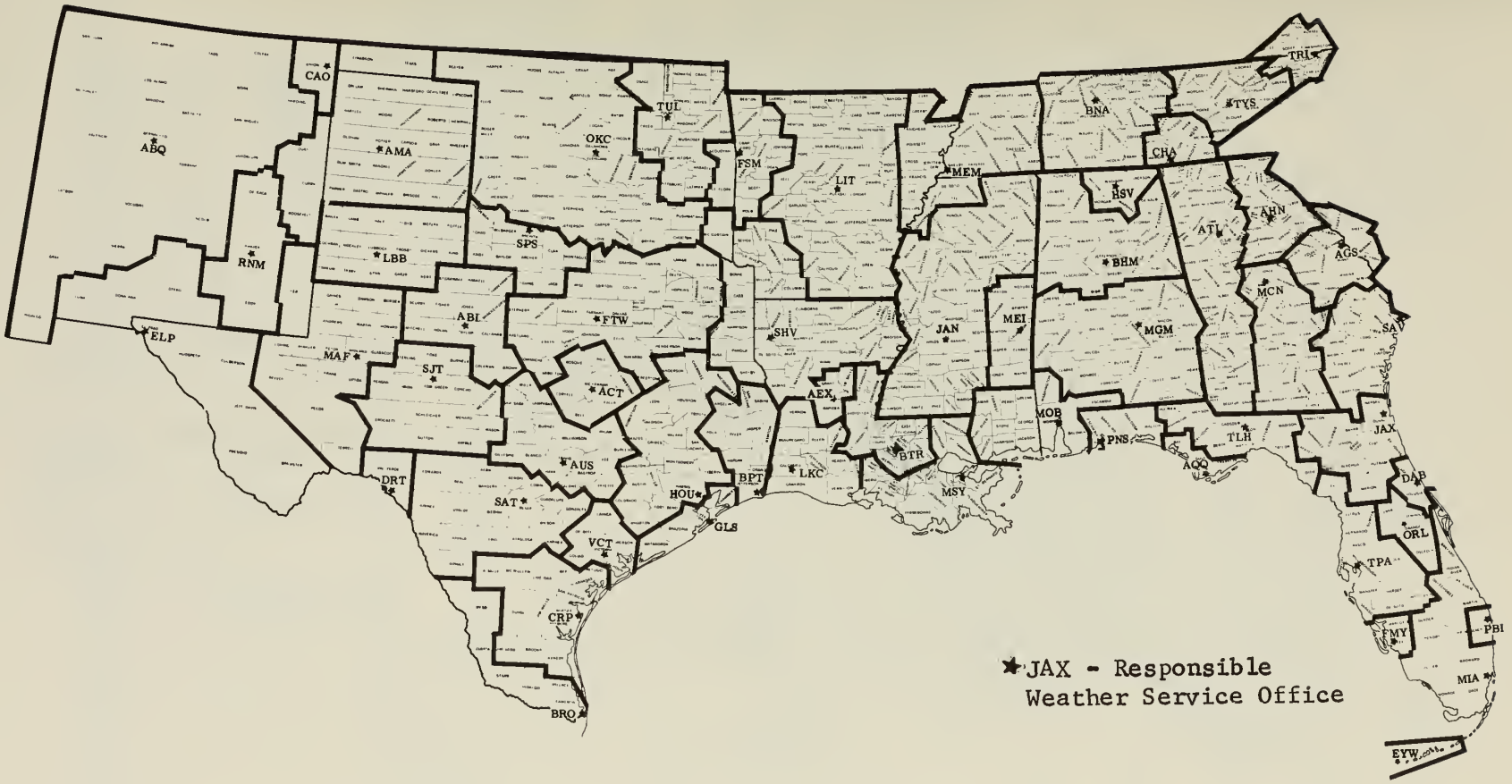
Assistant Chief of Staff for Intelligence
Department of the Army
Attention: ACSI-TE
Washington, D. C. 20310

Headquarters, Naval Weather Service Command
Building 200
Washington Navy Yard
Washington, D. C. 20390

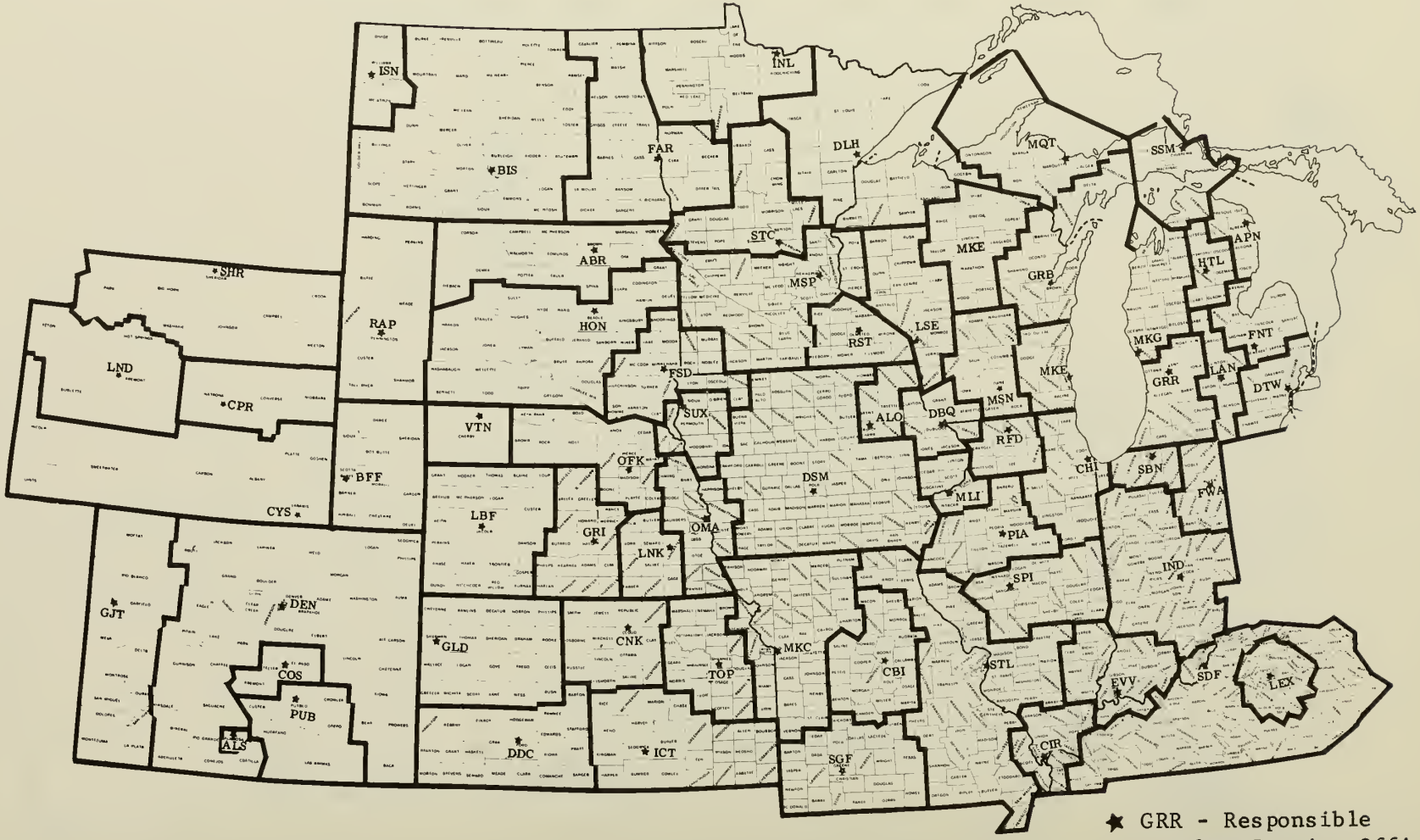
Headquarters, Air Weather Service (AWS/OI)
Scott Air Force Base, Ill. 62225

NOAA Public Information Office
6010 Executive Boulevard
Rockville, Md. 20852

Commandant, United States Marine Corps
Headquarters, United States Marine Corps
Washington, D. C. 20380



COUNTY WARNING AREAS - NATIONAL WEATHER SERVICE SOUTHERN REGION



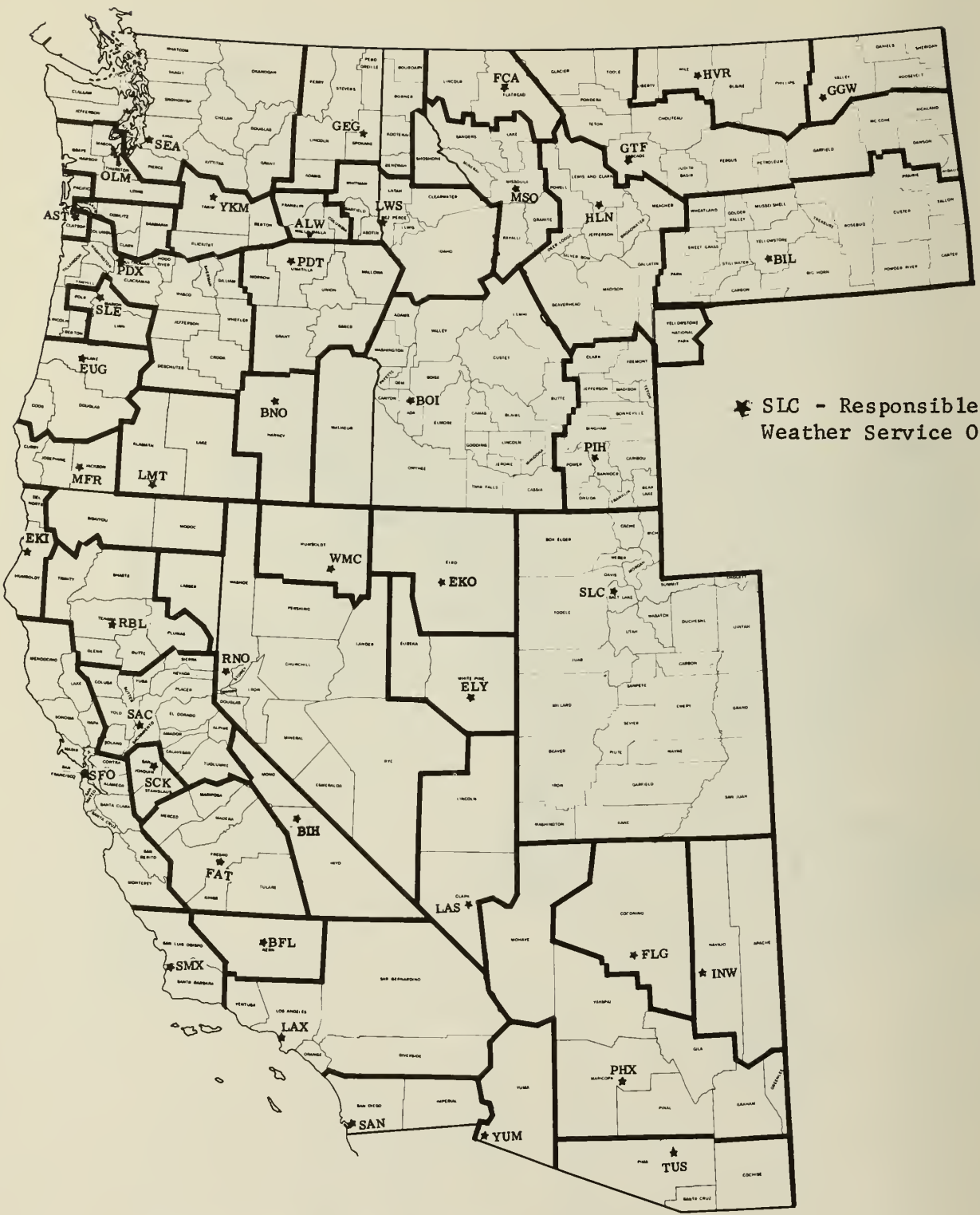
★ GRR - Responsible Weather Service Office

COUNTY WARNING AREAS - NATIONAL WEATHER SERVICE CENTRAL REGION

★ ALB - Responsible Weather Service Office

COUNTY WARNING AREAS - NATIONAL WEATHER SERVICE EASTERN REGION

ANNEX 1



COUNTY WARNING AREAS - NATIONAL WEATHER SERVICE WESTERN REGION

AIR DEFENSE COMMAND (ADC) RADAR SITES AND ASSOCIATED AIR DIVISION (AD) WEATHER STATIONS

1.	Baudette AFS, Minn. 48° 40'N. 94° 37'W.	23AD, Duluth, Minn.
2.	Blaine AFS, Wash. 48° 55'N. 122° 44'W.	25AD, McChord AFB, Wash.
3.	Calumet AFS, Mich. 47° 22'N. 88° 10'W.	23AD, Duluth, Minn.
4.	Cape Charles AFS, Va. 37° 08'N. 75° 57'W.	20AD, Ft. Lee AFS, Va.
5.	Charleston AFS, Maine 45° 05'N. 69° 06'W.	21AD, Hancock Field, N.Y.
6.	Fallon AFS, Nev. 39° 24'N. 118° 43'W.	26AD, Luke AFB, Ariz.
7.	Finland AFS, Minn. 47° 27'N. 91° 14'W.	23AD, Duluth, Minn.
8.	Fort Fisher AFS, N.C. 33° 59'N. 77° 55'W.	20AD, Ft. Lee AFS, Va.
9.	Fortuna AFS, N.Dak. 48° 54'N. 103° 52'W.	24AD, Malmstrom AFB, Mont.
10.	Havre AFS, Mont. 48° 53'N. 109° 57'W.	24AD, Malmstrom AFB, Mont.
11.	Keno AFS, Oreg. 42° 04'N. 121° 58'W.	25AD, McChord AFB, Wash.
12.	Mt. Laguna AFS, Calif. 32° 53'N. 116° 25'W.	26AD, Luke AFB, Ariz.
13.	North Truro AFS, Mass. 42° 02'N. 70° 03'W.	21AD, Hancock Field, N.Y.
14.	Othello AFS, Wash. 46° 43'N. 119° 11'W.	25AD, McChord AFB, Wash.

15.	Palermo AFS, N.J. 39° 13'N. 74° 41'W.	21AD, Hancock Field, N.Y.
16.	Port Austin AFS, Mich. 44° 02'N. 83° 00'W.	23AD, Duluth, Minn.
17.	Tyndall AFB, Fla. 30° 05'N. 85° 37'W.	20AD, Ft. Lee AFS, Va.

The AFGWC can contact all Air Division (AD) weather stations by calling the 10AF Switchboard, Richards-Gebaur AFB, Mo., and asking for the appropriate AD. After getting the desired AD, ask for 765 or 766, which will give the forecaster at all AD stations, with the exception of the 31AD, Oklahoma City AFS, Okla., whose extension is 721.

TABLE 1. Non-network Upper Air Stations Which Might be Sources of Data

STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIALS
Marshall Space Flight Center, Huntsville, Ala.	NASA	*See note.	Local loop to WBO Huntsville, Ala., then to RAWARC.	Bob Turner, FTS 205-453-3109.	Yes
Navy Pacific Missile Range Facility, San Nicolas Island, Calif.	USN Pacific Missile Range	Monday-Friday, 0000Z and 1800Z.	Routinely on Service C.	Tom Carr, commercial 805-982-7173 or 8508; AUTOVON 8-873-1750-7173 or 8508.	No
Navy Pacific Missile Range Facility, Point Mugu, Calif.	USN Pacific Missile Range	Daily, 1200Z. Unscheduled frequent soundings during missions.	None.	Same as above.	No. Will furnish unscheduled or 1200Z upon request.
Chico, Calif.	USAF	Monday-Friday, 1500Z.	COMET II.	Commander, Det. 58, 6th Wea. Wg. (Beale AFB); AUTOVON 831-1800, extension 2383	No
Naval Air Technical Training Center, Lakehurst, N.J.	USN	Unscheduled.	None.	Supt. of AG Schools; commercial 201-323-2228; AUTOVON 8-624-2228	Yes

*Observations are made on an unscheduled basis, dependent upon operations.

TABLE 1. Non-network Upper Air Stations Which Might be Sources of Data--Continued

STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIALS
El Centro, Calif.	USAF	Monday-Friday, to approximately 300 millibars, time variable.	COMET II.	Commander, Det. 24, 6th Wea. Wg. (Edwards AFB); AUTOVON 898-1500, extension 7431.	No
Goodfellow AFB, Tex.	USAF	Unscheduled.	COMET II.	Commander, or OIC, Wea. Det. 31, 6th Wea. Wg.; AUTOVON 733-3898.	Yes, during nonmission status if personnel are available.
Edwards AFB, Calif.	USAF	Monday-Friday, daylight hours, time variable.	COMET II.	Commander, Det. 24, 6th Wea. Wg.; AUTOVON 898-1500, extension 7431.	No
Cape San Blas, Fla.	USAF	Monday-Friday, 1800Z.	COMET II.	Commander, Det. 10, 6th Wea. Wg. (Eglin AFB); AUTOVON 899-1400, extension 883-1322.	No
White Sands Missile Range, N. Mex.	USA	Unscheduled.	COMET II.	C O, Met. Team, USA Electronics Command; AUTOVON 258-2211, ask for Met. Team.	No

TABLE 1. Non-network Upper Air Stations Which Might be Sources of Data--Continued

STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIALS
Fort Bragg, N.C.	USA	Unscheduled.	COMET II.	Commander, Det. 3, 16th Wea. Sq.; AUTOVON 935-3350, ask for Wea. Facility.	No
Fort, Benning, Ga	USA	Unscheduled.	COMET II.	Commander, Det. 10, 16th Wea. Sq.; AUTOVON 431-1410, ask for Wea. Facility.	No
Fort Sill, Okla.	USA	Unscheduled.	COMET II.	Commander, Det. 11, 16th Wea. Sq.; AUTOVON 883-1400, ask for Wea. Facility.	No
Fort Hood, Tex.	USA	Unscheduled.	COMET II.	Commander, Det. 14, 16th Wea. Sq.; AUTOVON 737-2131, ask for Wea. Facility.	No
Fort Carson, Colo.	USA	Unscheduled.	COMET II.	Commander, Det. 58, 16th Wea. Sq.; AUTOVON 691-5811, ask for Wea. Facility.	No

TABLE 1. Non-network Upper Air Stations Which Might be Sources of Data--Continued

STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIALS
Fort Huachuca, Ariz.	USA	Unscheduled.	COMET II.	CO, Met. Team, USA Electronics Command; AUTOVON 879-1110, ask for Met. Team.	No
Yuma Proving Ground, Ariz.	USA	Unscheduled.	COMET II.	CO, Met. Team, USA Electronics Command; AUTOVON 727-1450, ask for Met. Team.	No

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